

Airborne

MAGAZINE

NUMBER 104

March - April 1991

AUSTRALIA: \$4.20

NEW ZEALAND: \$6.20

(Inc. G.S.T.)



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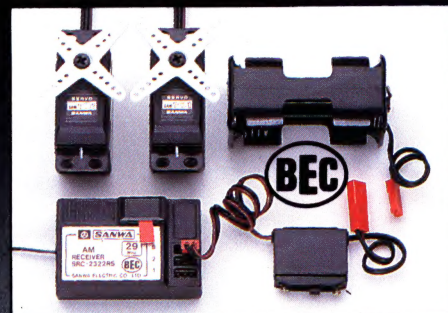


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SPACE BARON

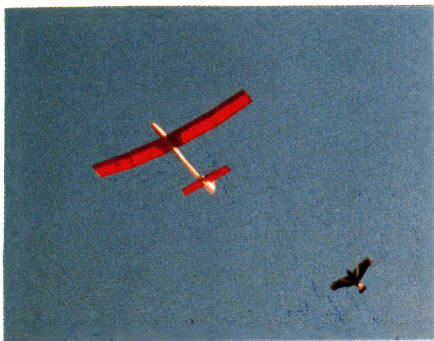
This exciting new model is designed by Shigetada Taya, the first F3C World Champion. The powerful combination of world class design expertise blended with Kalt experience and technology has created a new leader in the .30 class helicopter field. Pushing beyond conventional performance barriers, many outstanding features are incorporated into the overall design which includes the sealed maintenance free transmission unit, enclosing the unique compact planetary gear drive cluster.

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Spring time is magpie time at the Macquarie Uni! Model is a 2 metre glider, the only non-electric model in the hangar of electric columnist, Phil Stevenson. Murray Campbell took the photo. Pretty good, Murray!



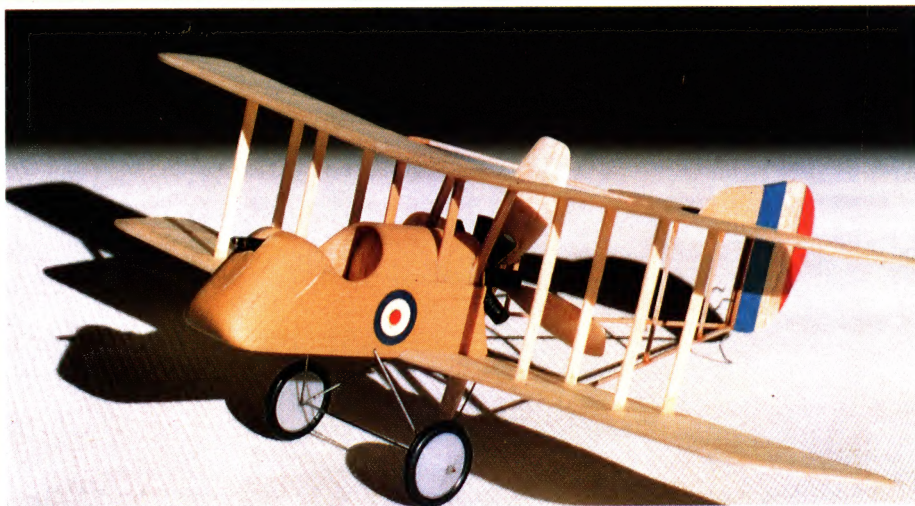
FAI Combat finalists at the Nats; Brian Randall and Graeme Wilson concentrate on the kill! Er the cut. They became equal Champ of Champs! Dislers photo.



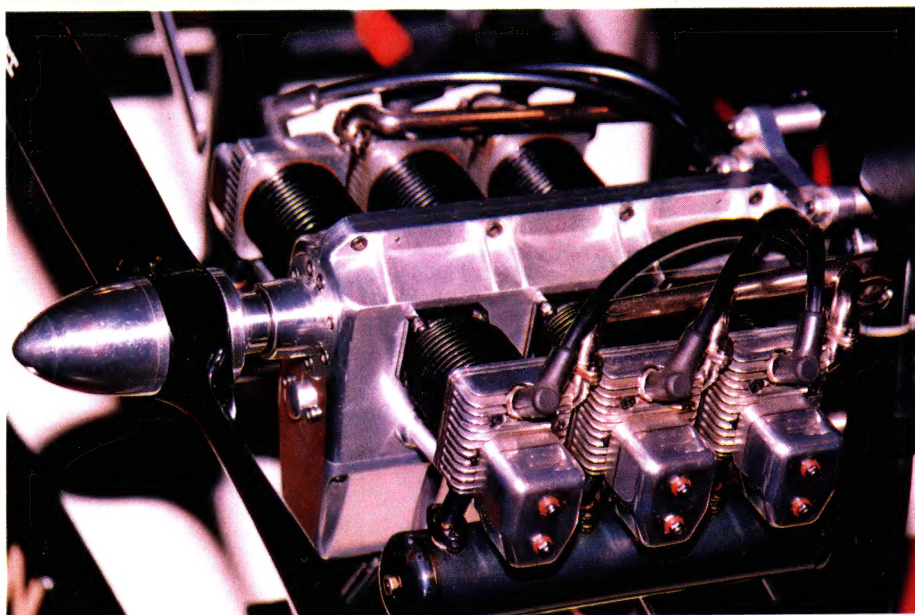
Brian Whellan's Gypsy Moth at the Twin Cities Seaplane day last year. Model is 5 years old and flies off wheels as well as floats. See Letters this issue. Photo from David Thorpe.



Here are Andy McCallum and Tommy Blank with the beginnings of a private air force! No need to name the models! More photos in Fantails this issue. This pic taken at Melton by DF columnist, Russ Weir.



Gumbus or Gumpusher. It's small but not a difficult model to build. Lots of fun and lots of character. Join the Gumnut brigade with any of the series in recent issues. Photo from Ron Neve.



Another amazing piece of engineering by Wim van der Hock. Fiat six four-stroke defies choice of adjectives! Note tapered intake manifolds. Photo from Bob Meyer via Wayne Hadkins. More about engines in reviews by Brian Winch.

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Original material should be double or triple spaced with a wide left hand margin. Photographs may be colour or black and white prints. Diagrams should be inked on tracing paper. Photos will be returned only if a stamped, self-addressed envelope is supplied. Material should be sent to:

The Editor, RMB 1798, Benalla, Vic., 3673.

Payment must be negotiated with the General Manager.

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COVER STORY

Bill Rodgers of the Suncoast Model Flyers Club took three years to build his 1/5 scale ten Kg. Mk VIII Spitfire "Grey Nurse". Construction is ply and balsa with 3/4oz. glass cloth covering. Power is from a Super Tigre 2500 swinging a 17 x 10 prop. Cockpit interior is fully detailed and looks really neat. The smile comes from Suzanne Strelow and the photograph from Kevin Poulter Studios - Melb.

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Germany's Most Menacing Fighter . . . Now a Success Series Kit

With the Midwest Messerschmitt, you can be the Hun-in-the-Sun and take off for combat with the Midwest Mustang. Like the Mustang, this plane will easily teach you how to handle a low-wing taildragger. Second in our series of fun-scale class warbirds, this model provides forgiving handling combined with maneuverability. Micro-Cut Quality wood components and the Success Series Construction Manual speed building time. From the jig-lock fuselage, D-tube wing construction, and all sheet tail surfaces, you'll receive many hours of trouble-free flying. The choice is yours - Mustang or Messerschmitt - either way, you're guaranteed fun.



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Flying Weight: 5-5½ lbs.
Radio: 4 Channel
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Kit includes:
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40 - 50 4-Stroke

Kit includes: Vacuum-formed canopy, Exhaust stacks & 4-color pressure sensitive military marking
Coming February, 1991

From the Cockpit

NEW TEAM MEMBER

Starting with the last issue (No. 103), the AIRBORNE team was joined by Monica Broughton, who has taken over the artwork from the Editor. In fact, Monica is doing the graphics arrangements for all three Ropomod magazines, AIRBORNE, Dirt & Track and Plastics Modeller. The layout of AIRBORNE has changed slowly over the years, and it has always been constrained by efforts to get as much material into the limited number of pages. Monica brings a new approach and fresh ideas, and I'm sure all readers wish her well in this challenging aspect of magazine work.

THE BIG SHOW

I went to the Nats. Just for the last three days. One was like a furnace, the next one was like a cold sauna and on the last one it rained. I survived. Many others went for eight days, when Bendigo provided more blazing summer weather. They also survived and deserve a medal! In spite of a regular 40°C and rising winds, the standards of flying were very high, and attendances were good. The committee, headed by Peter Harris, had everything under control (except the weather), and there were very few criticisms, which were due more to the heat (queueing for goodie bags at Administration on processing day and slow progress in some contests) than anything else.

It was a 160 km round trip to visit all the flying sites, but I didn't hear any complaints. We are all specialists these days, and there seems to be little urgency to visit other events after flying one's own. However, it would be nice. Everyone agreed that Bendigo is a beaut city, and the Vics deserve congratulations for a very good Nats.

If only we could all get holidays in April!

BEWITCHED, BOTHERED AND BEWILDERED

Anyone who has pursued some special activity, such as aeromodelling, for 35 years, would have to admit to being somewhat under its spell. Quite a normal situation, one could say. However, in some cases the bewitching is tempered by the necessity to deal with a multitude of people who

are under the same enchantment, which need not be a bother, even though it can lead to bewilderment.

I would like to thank all the people who came up to me to say "Hi!" during my time at the Nats. It is always encouraging to meet those whom I am trying to serve and who make my task easier by offering their contributions and ideas. I hope that I was not too bewildered, as there were times when I found it difficult to remember names and faces, and there were some I missed. Let's hope we have further opportunities to renew our acquaintances somewhere on a flying field, some time.

CORRESPONDENCE

Brett Glossop of 64 Weir Road, Harvey, in the West (postcode 6220) wants a computer program for a flight simulation for RC glider flying. He has heard of power model simulator programs, one described in RCM, and another being a Dave Brown product, but wants to know if there is anything available in Australia. If you can help, please write to Brett directly. I'm relieved that nothing like this was available when I started RC flying. I was up and flying at the third attempt, and a computer game would have held me back. There is no substitute for the real thing, surely?

TWO LEFT HANDS?

Somewhere among the pile of recent correspondence is a comment about the Irvine 20D shown on page 16 of No. 103, to the effect that the engine would run better if the prop were to be reversed. The photo, from David Boddington (who has made a bid for one of his diesels?) shows the motor being used as a pusher, so the prop is itself for reverse rotation. A reverse pitch prop (left hand, clockwise) on a pusher is actually OK! Two lefts make a right! Right?

DUCTED FAN VIDEO

A professional crew produced a video tape of the 1990 Leeton Ducted Fan Rally, and it is available from Leeton MAC for \$33, including postage. The tape is about 1 hour long and

covers the best of the weekend of flying. All orders will be sent to the producer at the same time to provide best economics (lowest cost) and to avoid illegal dubbing. So send your order promptly to Chris Bailey at Ambulance Station, Wade Avenue, Leeton, 2705. Enquiries may be made by phone on (069) 53 3935, as there should be a cut-off date for orders.

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Venue: Richmond RAAF Base

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Chief consultants: Ian Honnery, Chairman of the

Aerospace Foundation of Australia;

Air Marshal Ray Funnell,

Chief of the Air Staff, RAAF.

Reference: The Australian Bi-Centennial Air Show, October 1988.

Enquiries: Ross Dunlop,

Box E70, Parramatta East, 2170;

Phone (02) 630 2000; Fax (02) 630 4764.

VICTORIAN HELICOPTER STATE CHAMPS

Dates: F3C -

Sat April 20

Novice & Intermediate - Sun April 21

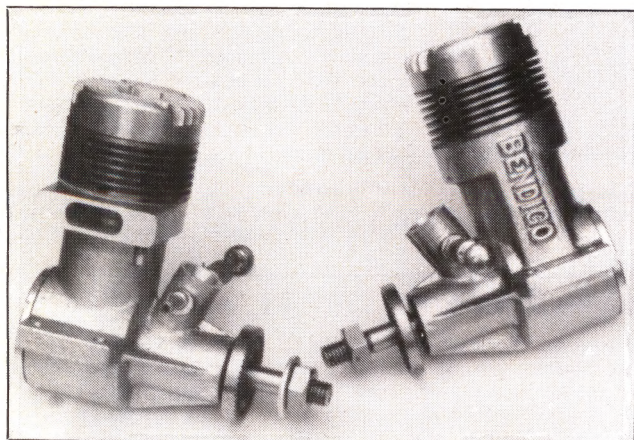
Venue: Melbourne Helicopter Club field, Chelsea

Enquiries: Paul Dewar; (03) 810 4592

With the World Champs being held at Drage Airworld in October, there has been an increase in the entries in the State Champs, requiring two days to run the events, so there should be plenty of action for spectators as well as the pilots and pit crews.

PLANS SPECIAL

There are several sources of plans, particularly of vintage models, in this country, and one that deserves reporting is Paul Straney at Box 304, Kilmore, 3764. Paul is an excellent draughtsman, does his own masters and provides dyeline copies at what could be called super saver prices. Contact him for a list of models that he has available, prices and postage details.



The special engines made by David Kerr to commemorate the 44th National Championships, the Bendigo 500. Two versions were made: the P series and the O series; only 15 engines in all. No more will be made; the crankshaft die will be destroyed. This engine is a first for Australian model engineering; a bold, bright step for modelling. Oh yes! It's a 5 cc glo!



Put yourself in the cockpit! Ron Mullinger of Greensborough flies his new biplane, by installing a side-view colour photo with both sides printed from the same negative to the correct scale for the model. Right and left hand photos are then glued to opposite sides of 1 mm plywood, sealed with two coats of clear Dulux and fitted to the aircraft. Ron says that other modellers strolling past the pits do a double take when they see the model! If you fancy yourself in the cockpit, this is the way to do it.

FROTH AND BUBBLE

In response to several requests for an article about plastic foam equipment and its use, readers are recommended to read the Argus book, *Foam Modelling* by David Thomas, available from Princeton Books. The whole subject is dealt with in the book, and since it would take several issues of the magazine to cover only the basic ideas, it would be some time before the requests would be answered. First of all we need someone to write the articles. Mark Adams gave some ideas in *Airborne* Nos. 98 and 99. Would any other reader like to contribute?

LOOSE SCREWS

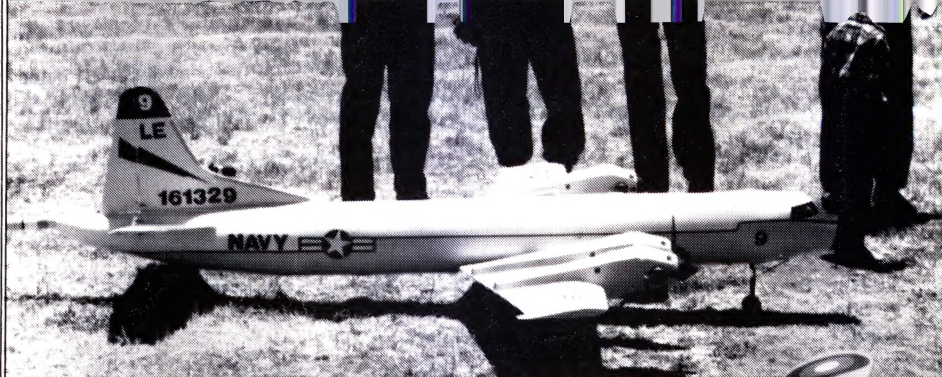
Ivor F has some 8 mm, 3/32 Allen head, sorry, hed, screws left over from one of his engineering projects. He is willing to sell them at a generously low price, so ring him on (02) 622 2140 to discuss numbers and prices. If you have a tap to match the screws you could use them to secure important parts such as engines and undercarriages on lots of models: in fact, you could go quite screwy!

WANNA JOIN THE BUZZARD?

Dave Thornburg's book, *Old Buzzard's Soaring Book*, is available from M & M Enterprises, 17 Milpera Crescent, Wantirna, Vic, 3152, for \$29.95 including postage. Thornburg's collection of thoughts about gliding go 'way back, just like the buzzards, and may help you join the aces of feathered soarers.

THE PROFESSIONALS

If you, dear reader, do not belong to the national association, the MAAA[Inc], this brief report is not for you. It is to give credit to the em triple-A members for supporting the organis-



Fred Coombe's 10 foot span Orion with 4 Enya 40 2-strokes. Flew realistically at the Noarlunga military day.

ation that governs aeromodelling in this great big flying field of a country. Most MAAA members do not have a good idea of what goes on behind the flight lines of the nation's modellers. What follows is just a little bit, but the most important bit of it.

I have just recovered from attending the 1991 MAAA Council Conference, held in the Keilor City Council Chambers near Melbourne International Airport over the weekend of 8, 9 & 10 February. Your state delegatse were flown into Melbourne and accommodated, at MAAA expense, for the weekend. There were about thirty modellers present, since several non Council members, like myself, were present as observers. We paid our own way. Observers are welcome, but it's just as well the other 7,170 of you did not turn up, as we ran out of chairs!

I am not going to tell you about the decisions that were taken during the 2½ days of conference, because Chris Greenwood, the Fed. Sec.,

will tell you in the MAAA News column next issue. I want to tell you what the delegates actually did. **The Conference is no weekend of junket!** If you wanted dessert you had to pay for it yourself. Discussion began on Friday evening after the delegates had flown in. At 0800 hours Saturday morning the official business began with the Tech Sec, Ron Ericson having provided dossiers of the business agenda items, very professionally presented. Beside the conference room was a small kitchen where anyone could get a cuppa any time. There was no lunch break! Sandwiches were brought in and Wally Schubach and Pearl played waiter and waitress while business proceeded.

We adjourned after 1700 hours to have a breather before going to the local Chinese restaurant for dinner, after which unofficial discussion resumed till very late.

The next morning, Sunday, the conference party (almost complete) was waiting to enter the Council Chambers before 0800 hours! Again! During business, coffee and sandwiches were taken ad lib till about 1630 hours when the Conference was officially closed by Ringmaster David Axon. Final conversations were rather brief, as everyone was, by then, visibly sagging. I can tell you, dear MAAA member, that your delegates do work; i.e. WORK! for you. And they give up a lot of building and flying time to do so. It took me a day to recover!

After a period in the dim past where the MAAA was little more than a name only, we have had a long period, beginning with Gordon and Josie Burford, during which the MAAA has been building up a financial base on which it can do something for its members; that is, something more than getting insurance, RC frequencies and air space. We have now entered a period during which the em triple-A will make you proud to be a member. Follow the story in the column in coming issues of the magazine!

CORRECTION

Contact address for VFFS Secretary, Colin Parker, is 17 Dirlton Crescent, Park Orchards, 3114.



The Simprop Schleppi (little hauler), one of 3 kits under evaluation for RC powered model kit of the year. Materials are ply, spruce and obechi veneered foam flying surfaces. Engine is a Fox Eagle 74 for aero towing. Sanwa radio with a servo on each aileron, plus one for towline release. Span is 80 inches, weight 9½ lb. A top class kit, says Stu Richmond, who sent the photo.

PLANS

Bikini: 1946 FF power model for 1.5 cc, by Jaques Morisset.
Bunyip & Mongoose: CL speed models by Ivars Dislers.
Crowbar: 1958 FF power model for 1.5 cc, by Basil Healy.
Force 10: 1990 RC aerobatic model for 2.5 cc, by Guy Carlson.
Golden Boomerang: 1948 FF power model for 2 cc, by Adrian Bryant.
Half A Quanger: 1990 RC powered soarer, by Merv Buckmaster.

PLANS

PLANS

PLANS

PLANS

Hereward 2: 1939 Wakefield model by Jim Fullarton.
Irate Budgie: 1990 Introductory electric RC model, by Nick Siefkin.
Provincial: 1950 ½A FF power model, by Bernard Marsh.
Sky Shark: 1990 RC motor soarer for 1.5 cc, by Bob Moye.
Skystreak: 1990 RC aerobatic model for 4 to 6 cc, by Vin Masters.
Whisper 3: 1990 RC electric soarer for 05 motor, by Merv Buckmaster.

These plans are available from Ropomod Productions, PO Box 30, Tullamarine, Vic., 3043. The details and construction articles are in **AEROMODELLING DIGEST 1990**, available from Samaria Concepts, RMB 1798, Benalla, 3673, for \$15.00, including postage.

WHEN YOU ARE LOOKING FOR SOMETHING BETTER

1946 saw the first commercially available Super Tigre engines. Since then Super Tigre has made many contributions to model aeroplane engine technology. Super Tigre was one of the first to successfully put the ABC concept into production. Super Tigre pioneered the squish band head and patented what was known as Super Tigre flat top piston porting, now more commonly known as Schnuerle porting. Since these heady days, Super Tigre has not rested on its laurels, development of model aircraft engines has continued at a frantic pace with a range of engines from the XII BB

through to the massive S6000 in line 60cc twin.

When you build an aircraft you want an engine that performs reliably and with the power you expect. Super Tigre delivers the goods. Some of the latest Super Tigre engines incorporate the new T.S.T. porting (Transfer Super Tigre) with four by pass ports! All Super Tigre engines are backed by a reputation for excellence.

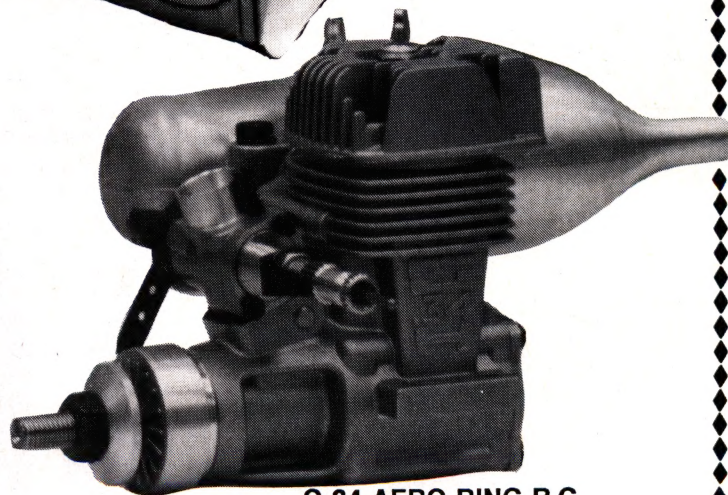
See your local hobby store for the complete range of Super Tigre Engines or contact us direct.

BRYZEN HOBBIES

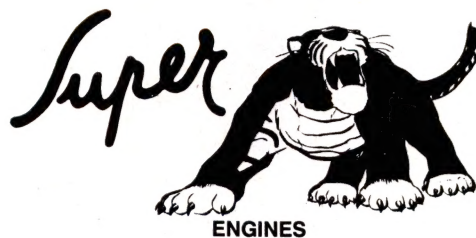
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G 34 AERO RING R.C.



Dear Sir,

I can answer the question raised by your columnist, Russell Weir, about the badges on the Mirage F.1 built by Graham Redding and shown on page 60 of Airborne No. 101. It is the Spanish military aviation. Both the red and yellow roundels and the black X on white on the rudder date back to the Spanish civil war of 1936-1938. The roundels reflect the colours of the Spanish national flag, and were adopted by the Spanish nationalistic aviation of General Franco, whose army was fighting against the communist-led republican army. The black X on white was the badge of the Legionaire aviation sent by Mussolini to help the Spanish nationalists. After the death of General Franco, the black X was reduced in size, and nowadays it is just a small thing on the top of the rudder.

I am familiar with these things because a relative of mine fought in that civil war as a fighter pilot in a Fiat CR 32 of the Legionaire Aviation. He was later killed in a stupid landing accident. I was then a young kid, and these facts were much talked about in our family.

Yours faithfully,

Ing. Ferdi Gale, Baveno, Italy.



Dear Sir,

I am referring to a letter I saw Airborne No. 103 asking young modellers to write in. I am 14 years old and I have only just started to fly radio controlled planes. I have a Prelude glider with an Enya 15 attached to the centre of the wing. I built it with my friend who knows a lot about RC planes. Without him I would not have been able to build it the way we did. It flies very

Letters to the Editor



Paul Lummis' Prelude with Enya 15, a fairly lively combination but a good one for an ab initio pilot.

well and I think it is perfect for a beginner.

Yours faithfully,

Paul Lummis

And you use Futaba radio. Thank you for your letter Paul, and best wishes for your flying. I have sent you something from the Editor's Special Awards box for your contribution.

Dear Sir,

The 4th Annual National Electric Rally will be held in Wangaratta over the Easter weekend, 1991 (Friday March 29 to Monday April 1). Wangaratta is the centre of a winemaking area, and there are many local attractions for a family holiday, including Drage Airworld, and glider and balloon flights at Benalla. Wangaratta is also the site of the Triple World Champs later this year.

Anyone wanting more information about the electric event at Easter should contact me at P O Box 220, Oxley, Vic., 3678, or phone [AH] (057) 27 3446.

Yours faithfully,

Ray Pike.

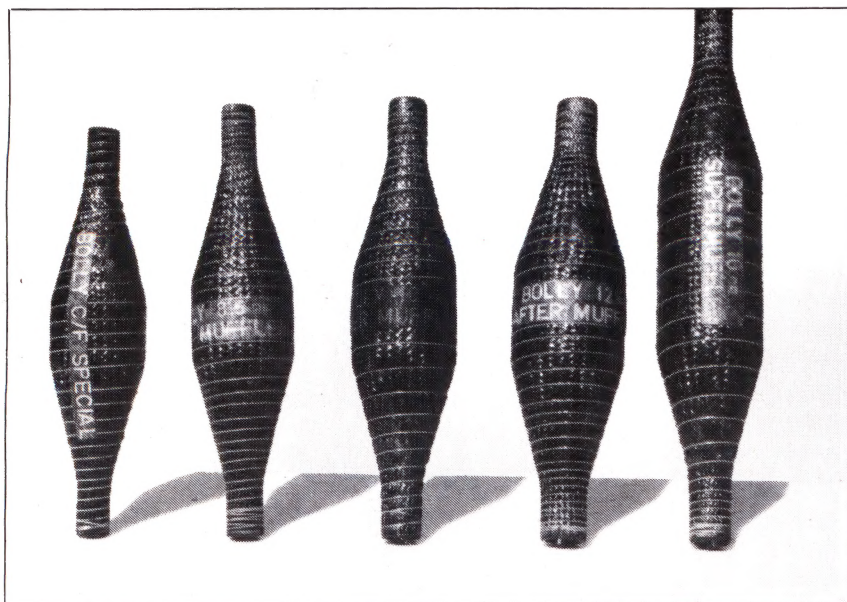
(There are more details about events to be run at this rally in Phil Stevenson's column this issue.)

Dear Sir,

I am writing to you to get some ideas as regards to water plane activities here in Australia. I have attended the Twin Cities Float or Seaplane Weekend in Albury which, in my opinion, has great potential as a venue to hold large get-togethers of this nature. I have also been in contact with Tim Nolan about the Sydney Float Fly-In, and it seems as though there is a big increase in water plane operations up there. I have talked with Tony Farnan here in Melbourne about the amount of interest in water plane activity here, and it would seem that with a little bit of PR and some push in the right direction we could be on the verge of seeing a big increase in people wanting to try flying off the water.

I have been following, with great interest, the seaplane scene overseas, and it would appear that things are really happening over in the USA, on the Continent and in Britain.

What are your feelings on getting a few clubs and the states together and having really big Float Fly-ins which are central for all of us? Are we big enough to form an organisation like the



A selection of Bolly after-mufflers made from carbon fibre and epoxy. When matched to the exhaust outlet size there is about 4 dB noise reduction and a gain in power. The smallest weighs about 28 gram.



Leo O'Reilly with Ayrton Senna, the Formula One World Champion, after the Adelaide Grand Prix last November. Ayrton flies regularly with Hanno Prettnr in Europe and with Tommy Takomatsu in Japan, and is an excellent pilot, performing lomcevaks, falling leaf and inverted spin manoeuvres at the Monarto field with this Model Flight Chippy. Leo sent the photo.

British Water Plane Association, or do you think we should just let things build up a bit first and see what happens, and let it all fall into place?

Is this only a bit of a pipe dream, or do we have a big chance to make this thing come alive? I would like to hear your views on the above ideas.

Yours faithfully,

Doug Cole, Victoria.

Readers may send their comments directly to Doug at 24 Gladys Avenue, Croydon, 3136.

Dear Sir,

I do not know much about noise, but I know what I don't like. It has always seemed to me that the approach to noise assessment, of measuring merely the dB, is wrong.

I believe that what brings down the wrathful hordes on model flyers is not sheer volume, but pitch and volume. I suspect that, for this reason alone, four-stroke motors are less unacceptable than two-strokes. The same almost certainly applies to propeller noise, however it is caused.

It also seems to me that our troubles with noise began with control line flying, when the actual level of noise was not great but the pitch was high and also fluctuating as the models went round and round. To tell the truth, this sound drives me crazy, and I sympathise with people who object to it. It is much the same with pylon racers, I fear. A loud noise is disturbing; a high-pitched, loud noise is painful; a loud, fluctuating, high-pitched noise is utterly dreadful to many people.

Hence it seems to me that some kind of "annoyance factor" should be worked out which combines dB with frequency. This would be a more constructive research project than merely measuring dB in a wind tunnel which, I agree, has all kinds of difficulties. When we know what causes the public reaction we might know better how to save ourselves!

Airframe noise caused by vibration and resonance is certainly a reality. So, too, is noise generated merely by airflow. I remember being peacefully attending a class in an ATC school many years ago when a Horsa transport glider dived, pulled out and passed low overhead with flaps down. We all cowered in our desks. It roared, just like a bomber!

However, the typical model aeroplane, engine off, makes only a swishing sound, and I have not heard anyone grumbling about this. However, one interesting point arises. Sometimes a hole or other opening in an aircraft can whistle loudly like a flute. This used to occur, for instance, on the Astir full-scale sailplane, and was caused by the round hole under the tail of the fuselage, which was intended to accept the tail dolly wheel used for ground handling. A square inch of tape

over the hole and the noise stopped. Also, when the air brakes are opened on the old Olympia sailplane, the steel tubes thus exposed to the airflow make a loud whistle. Plug the tubes and no whistle occurs.

I don't know that this is of much help, but I do support your efforts to get quieter models. One way, of course, is for us all to fly sailplanes!

Yours faithfully,

Martin Simons

Dear Sir,

As I pleasurably renew my subscription, it came to mind to voice a suggestion concerning a great interest amongst all modellers in all forms - model mishaps! Everyone I talk and listen to shows quite an interest in telling about their model mishaps or near-disaster rescues when a crash seemed inevitable, and listening to how and why everybody's model took its fateful plunge. We are always committing to memory great lessons learned from other modellers' stories (and our own), so I think that one page could be devoted to a letter section, surely to prove a real hit because of interesting reading and valuable learning from another modeller's mistakes.

Yours faithfully,

Shane Burrows, Victoria.

Dear Steve and Val,

I am writing to express my personal thanks, as well as those of the other members from Kelly Field (Hobart), for the time you spent at the Flight Instructors Testing weekend. We all enjoyed the weekend, and learnt a great deal from it, even though it meant being back in school for a brief time!! The idea of a uniform standard of training and testing has considerable merit, both from a safety point of view and allowing people to move around other clubs and being accepted as a safe and competent RC model pilot.

I read with interest the article in Airborne No. 103 MAAA News about a club with very similar flight training and testing procedures. In fact, I was a foundation member of such a club many years ago. However, a point that may have been overlooked was training and testing where ALL manoeuvres should be carried out from both right and left, not just landing circuits!! Let me say that I benefitted considerably from that particular club's approach to safe flying practices, and my comments are not a criticism, but time marches on, and at last there are many other people in the hobby who have seen the light.

At the field last weekend it was interesting to hear some of the positive responses to our weekend's training, and a request from other

members who wished to be examined for the Gold Wings, so we await the outcome of the written exams and subsequent authority to test club members.

Yours faithfully,

Shevill Mathers, Rosetta, Tasmania.

In at least one state the Gold Wings is being ignored because the requirements do not suit the Old Timer style of flying. Perhaps there should be separate Gold Wings for Pattern, Pylon and Old Timer.

Here is another letter about two unrelated subjects, aerofoils and noise, both of which have prompted some controversy in recent issues. Letters is an open forum, not aimed at declarations of truth, although that may be found with a little searching, but at providing the opportunity for readers to express their opinions and points of view.

Dear Sir,

Airborne No. 102 is just too controversial to be ignored. While Martin Simons is busy tilting at windmills, Messrs. Gillott and Bolly are inside turning the sails!

Now Martin, about the uniqueness of Clarke Y. I've just put down Riegel's book on airfoil sections; right there I found a whole swag of Clarke Ys, down to 2% thickness, complete with polars. And camber line doesn't seem to be all that unique, either. Not only does Charles Hampson Grant (Model Airplane Design, 1941) discuss both undercamber (Hb) and uppercamber (Hu), but derives the lift, L, given the chord, C, by the formula:

$$L = (3H_u + H_b) / 4C$$

on the basis that the upper camber lifts three times as much as the undercamber!

Meanwhile, inside the windmill, the noise of battle is positively deafening. Mel, two equal sound sources add 3 dB to the noise level, not 6 (Vin Masters, Airborne No. 97), and Les, your rules-of-thumb for muffler design are simply wrong. The requirement on after-muffler exhaust outlet is only to allow the exhaust gases to clear the muffler while the exhaust port is closed. The existing exhaust outlet area is irrelevant. Further, the muffler does not need to have a large volume, only enough to accept the expanded gases from a single stroke. Also, a tortuous path for the exhaust gases has little to do with muffling. The sound wave travels independently of the exhaust gas flow, and is readily absorbed in a simple expansion chamber with no internal plumbing or baffles.

Yours faithfully,

Stuart Sherlock

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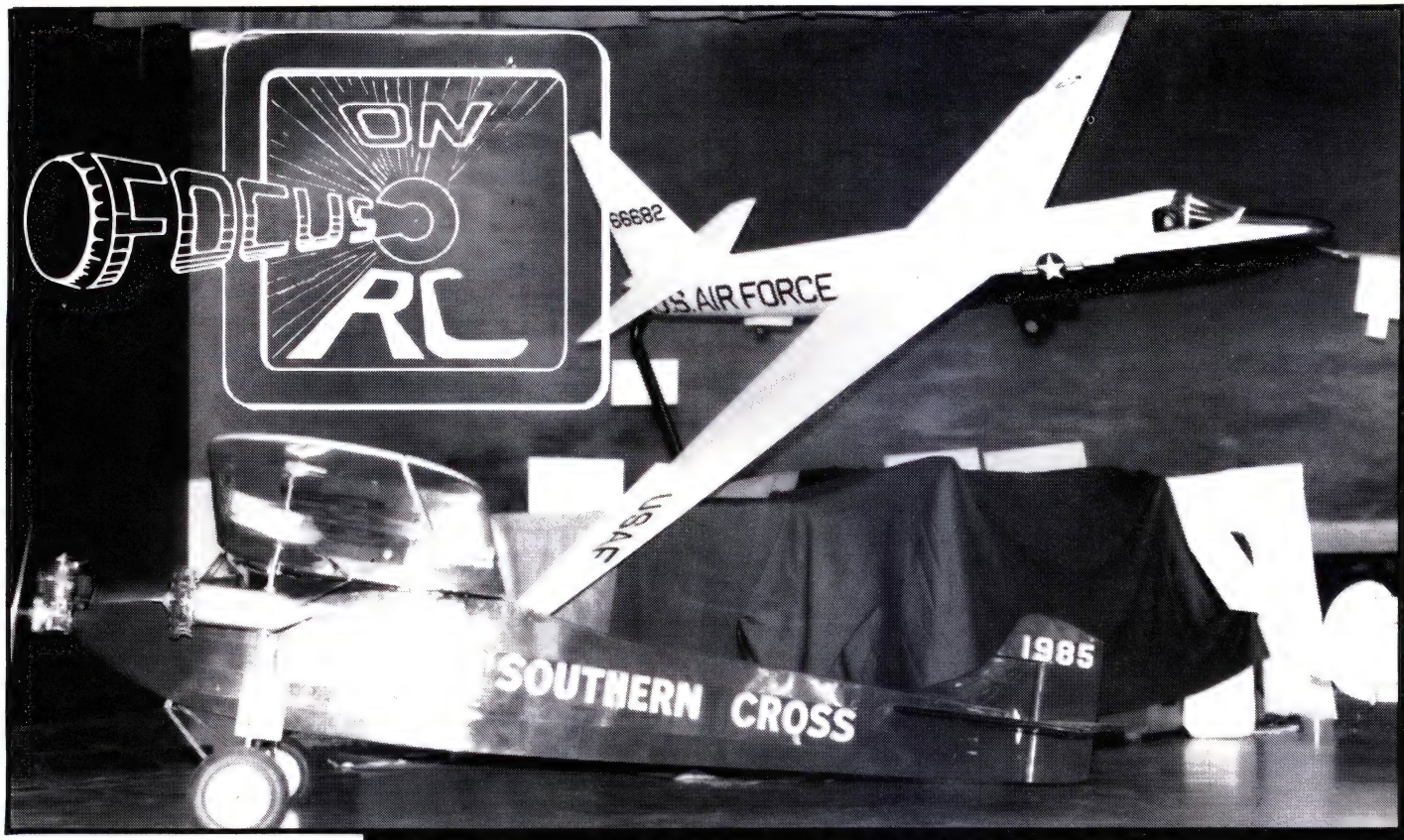
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VARMS Model Expo 1990. Scale giants: 12 ft Southern Cross built by the late Keith Hearn and flown by him across Port Phillip Bay from Point Cook Air Force Base to Casey Field, Berwick, in June 1978; 15 ft glider model of Lockheed U-2 built by members of VARMS over the last 18 months. Was ready for exhibition but awaits detail finishing and installation of control systems. McLeod photo.

by Mel Gillott

V.A.R.M.S. EXPO '90

from Neil McLeod

As in previous years, the organising of EXPO '90 was guided capably by the VARMS Publicity, Meetings and Liaison Officer, Jim Robertson. Specialised aspects were overseen by other Expo Committee members. Peter Boyd arranged representation by clubs and the model trade. Peter Cossins co-ordinated the flying displays and sound systems, doing most of the commentary during the displays as well. Geoff Hearn, besides persuading his aunt to allow the display of his late Uncle Keith's Southern Cross, had the task of finding outside static displays, which was complicated by having to find them on the weekend before the Melbourne Cup when many otherwise willing people had other events to attend. Stan Mason kept the accounts; this year for the first time having a special Expo account to simplify his task. Because the VARMS Expo has started to assume the status of a tradition with the aeromodelling movement of Australia (well, Melbourne, anyway), some folk seem to have an inflated idea of the profits flowing from it to VARMS. At the final Expo Committee meeting Stan was able to dispel that myth. Really, the greatest value of the Expo is social rather than financial, with a little prestige thrown in to give the workers an inner glow.

As well as the overall organisation, many members and their families donated time and toil to many details needed to ensure the success of the show. Members promised models and videos for the VARMS display which John Gottschalk co-ordinated. Sponsorship to help cover up-front costs was found. Hobby trade

sponsors donated trophies and door prizes. Posters and leaflets were printed and distributed. Jim found that local schools were highly effective outlets for publicity and spent many hours visiting them to secure space in their newsletters and bulletin boards. As the date drew nearer, advertis-

ing and editorial articles appeared in the nearby suburban newspapers. Community Interest Notices were mailed, not faxed, to the radio stations and the week-end guides of The Age and Herald-Sun.

On the two Saturdays preceding the Expo, Jim



Assembling Southern Cross for exhibition are VARMS members, from top, Geoff Hearn, Doug Anderson and Harold Frodsham.

secured display space at the large shopping centres of Brandon Park and Chadstone, where models were set up, leaflets distributed and hundreds of people invited to the Big Show. It is surprising how many active or ex-modellers were there. Not so surprising was how many people asked the same questions: "What's it cost?", "Did you make it yourself?", "What are they made of?" and "Are they for sale?". The interest was never-ending.

The eve of the big event brought furious activity and, be thankful, perfect weather. Immediately we gained access to the hall the dividers for the stands down the centre space were erected speedily by a crew who, by now, have had plenty of experience with them. The model clubs' stands had been planned and prefabricated with ingenuity, and modified by experience of previous displays so that this year they went up with few hitches. The trade stands showed similar expertise and, in some cases, no little expense. It was obvious that the clubs had given thought to showing off their best.

PARTICIPATING CLUBS

V.A.R.M.S.
Doncaster Aeromodellers Club
Surrey Park Model Boat Club
Lilydale & District M.F.C.
Pakenham & District A.R.C.S.
Dandenong Knox R.A.C.
Melbourne RC Helicopter Club
Control Line Advisory

TRADE DISPLAYS

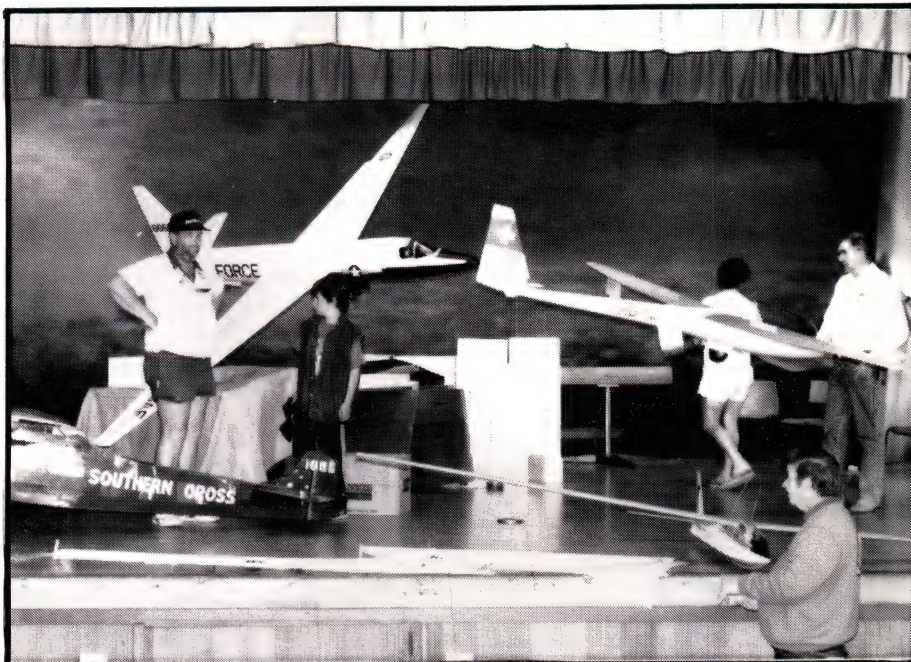
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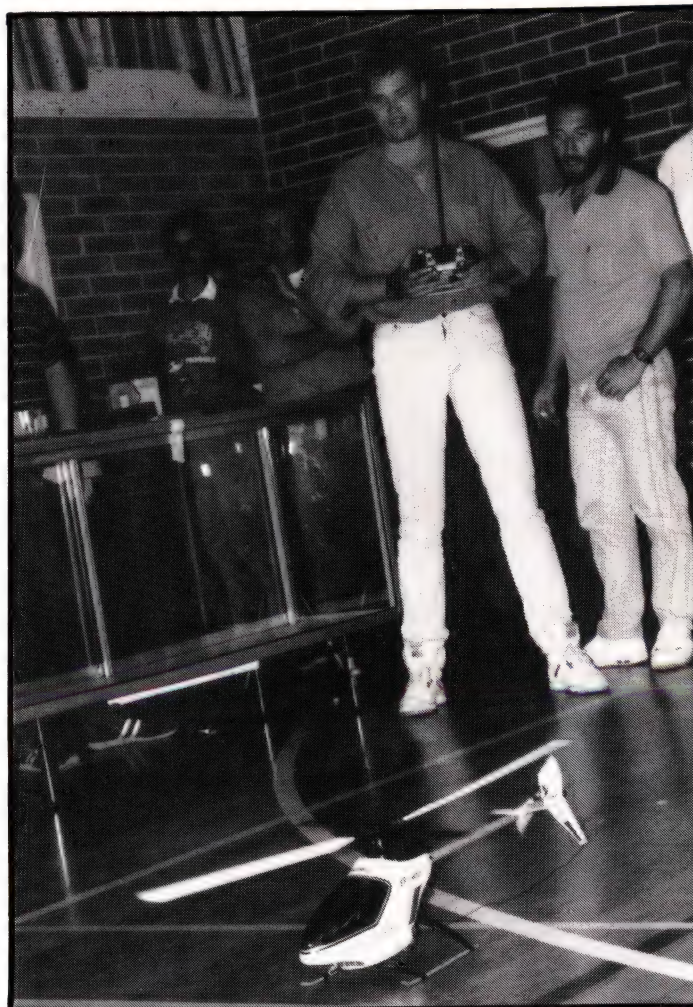
Major Sponsorship: B.P. Australia

This year's innovation was the G.J. Kites stand. Kites have made an entrance to Melbourne's model shops and appeal to some members of VARMS as a change of pace ... not usually to a slower one! On Sunday the outdoors demos were begun with a display of the flying of aerobatic kites by Geoff Setford of G.J. Other notable displays were put on by Cliff McIvor, climaxing with multi-turn spins; Scott Lennon with precision aerobatics with his Ricochet; Cliff Fiddes and Tony Farnan showing different facets of electric flight; and all sorts of control line flying by a team from CLAC. The high point of each session was the display by the Helicopter Club's demo team.

Overall, the money raised for the VARMS site fund is not the most valuable result of having an annual event of this kind. The uniting of the resources of model clubs and the hobby trade to present a public showing of our special interests has many outcomes in increasing understanding and, hopefully, goodwill between the participants in a movement that is fragmenting into groups divided by special interests or geography. In this way it deserves to take its place with events like the Futaba Trophy and the public displays run by Doncaster and Lilydale clubs which, in different ways, bring modellers together in collaborative effort.



Setting up stage display at VARMS Expo '90. Left to right: Geoff Hearn and son, Todd, Colin Collyer, John Gottschalk with his Elfe. Advising from floor is Frank Smith.



During set-up for VARMS Model Expo '90, Melbourne RC Helicopter Club displays indoor electric flight.

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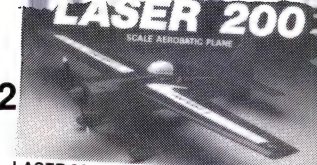
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11 x 6.11 x 7.11 x 8.11 x 9.12 x 6.12 x 7.12 x 8.12

Competition

11 x 10.11 x 11.11 x 12.11 x 12W.11 x 13.11 x 14.
12 x 9.12 x 9W.12 x 10.12 x 10W.12 x 11.12 x 11N.
12 x 12.12 x 12N.12 x 13.12 x 13N.12 x 14.
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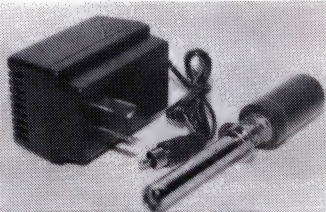
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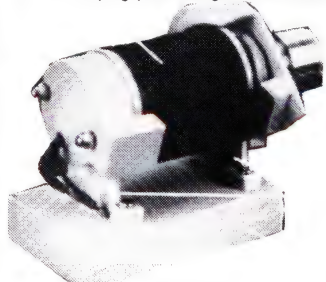
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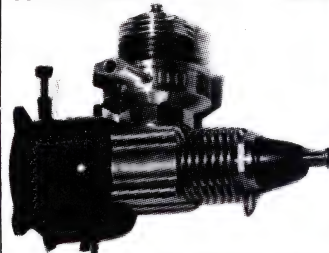
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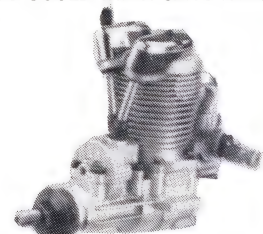
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THE REAL DOPE

by Len Williamson

For tradesmen who apply paints and varnishes to earn their daily bread (and a spare car for Mum at their present rates of pay!), there have been startling changes in their work practices during the last year. No longer do they apply whatever the boss provides without question. No longer do they apply coatings having sophisticated formulations in unventilated conditions unlike many aeromodellers for the simple reason that, as time passes, they can see the casualties in their ranks growing around them. Nowadays they read the label on the can. If no information is given and there is reason to suspect the presence of harmful materials, they down tools (brushes) and through their union rep demand a sight of the manufacturer's specification data sheet - often referred to as the MSDS. If there is no sheet the paint is automatically banned through a list that is circulated to all union branches. At least that's the idea, and it's catching on.

In the USA a tradesman applied an epoxy paint in a basement. During the third day on the job he didn't feel well and went home. In a few days he died of massive liver failure. Why? The paint contained nitropropane as solvent. It was the third fatality in the USA with this solvent. There are only two possibilities. Either the paint was not adequately labelled or the unfortunate painter could not or did not read the label the published accounts of the incident unaccountably remain silent on this point. (Incidentally, if any of you are using nitropropane as a fuel, please drop me a line through the Secretary of the ACT Kambah Model Flying Club. If you do, please let me know the source of the supply.)

A few weeks ago Murphy gave me his undivided attention, and two power models suffered near



Volatile and flammable solvents storage under bench on concrete floor in basement. Stocks of dope, ether and methanol are not visited often. Access is easy, and no damage caused by spillage. Lacquer thinners is also stored nearby in the cool and dark.

destruction in bad prangs. Since rebuilding was going to be a tedious (for me, agonising) operation, I dug out the Old Timer (a Buccaneer) from under the house. It would be something to fly on Sunday mornings! I decided to strip the fuselage and recover with tissue then dope and varnish. My litre can of dope was a quarter full, or less, when it was last used a year or so ago. It was now thick and nearly gelled. Still, it was OK for painting the framework. A new can was purchased for the rest of the work. The new and the old had different odours. The old had a sweet, rather fruity pong; the new was dominantly acetone.

I read the labels. They advised that two solvents were present. Acetone was one. The other was a hydrocarbon. Neither of these had the characteristic odour detected in the old can. The labels also stated the amounts of the two solvents in weight volume units. These were the same. Knowing their densities it was easy to work out that the sum of their volumes did not add up to 100; something seemed to be missing!

So I determined the non-volatile content of the new can of dope; that is the material left on the

model when all the solvent has evaporated. This turned out to be 5.8% by weight. (Yes; you are buying about 960 ml of solvent in a litre of dope.) During this work I detected the same fruity odour noticed earlier in the old concentrated stuff - the acetone in the new had masked it.

Next I examined the film from the solvent-free dope. It burned very rapidly without smoke; typical of cellulose esters.

So my analysis suggested that 1 litre of dope contained: 342 ml solvent A, 375 ml solvent B, 242 ml undeclared solvent and 41 ml cellulose ester. Without a formal identification we could believe that the missing solvent would be largely butyl acetate. But was there any high boiler? Unlikely, although these are sometimes added to improve the mechanical properties of the cellulose ester films. In Airborne No. 93 on page 27 I gave a table showing the toxicity of the vapours of solvents used in dopes, lacquers and cements. The most harmful are the glycol ethers, as represented by the Cellosolves. Bearing in mind that dopes are much used by young newcomers to aeromodelling, I was moved to write to the Australian manufacturers requesting their assurance that no glycol ethers were present in their product ... panicky, perhaps, but with the horror caused by nitropropane in the USA fresh in my mind I felt no remorse. At the same time I sent my analysis.

The manufacturer supplied me with the formula and I was pleased to see that no glycol ethers existed. The undeclared solvent was, in fact, butyl acetate.

Unfortunately, in the past our Australian packaging and health regulations have been legislated on a state basis, which makes it difficult for manufacturers selling nationally. However, the can, bottle or tube should have an accurate label or, alternatively, a specification sheet should be available.

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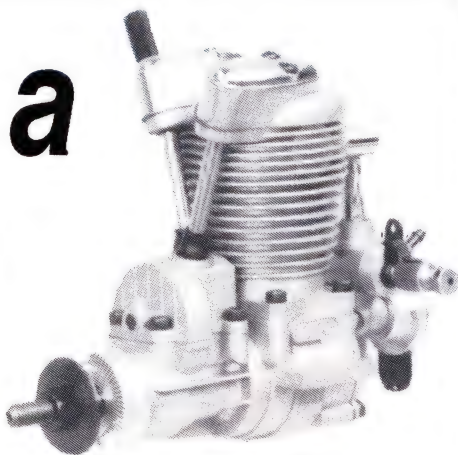
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FANTAILS

LOCAL MANUFACTURING

We see so many reports these days about the state of our economy and, of course, the effects being experienced by most families. Let us hope that these events are only temporary and have minimum impact on our lives.

One of several major reasons given by the so-called experts for the current state of affairs is that Australians are spending too much on imported goods. However, it is impossible for every type of product to be manufactured in Australia, or any other country for that matter. Also, I would not be surprised if our entire hobby industry imports less than one car dealer specialising in luxury imported models!

This leads to the question, just what modelling products are manufactured in this country? When the subject is researched the results are quite surprising, as there are more products created in this country than would be expected. There are several large organisations and many individuals working away at an ever increasing list of items, many of which are exported and held in high esteem overseas.

The following list is a general indication only. Some of the products are not advertised but are made known only by word of mouth. There are balsa kits in most categories of model including fibreglass sailplanes, large scale power and ducted fan kits, locally processed balsa supplies, propellers, retract landing gear, aluminium spinners, aluminium engine mounts, aircraft wheels, tuned pipes, canopies, fuel, synthetic lubricant, plans, adhesives, electronic items such as chargers, several books and publications, not forgetting our own magazine, *Airborne*.

The major items missing from this list are engines and radio equipment. Unfortunately, these items, which were manufactured in Australia in the past, have bowed to the pressures of the economics of scale. There is just not a large enough market in this country for these products to be manufactured profitably. Nobody is going to become rich by manufacturing modelling products, however, there is some satisfaction in attempting to meet the needs of other modellers.

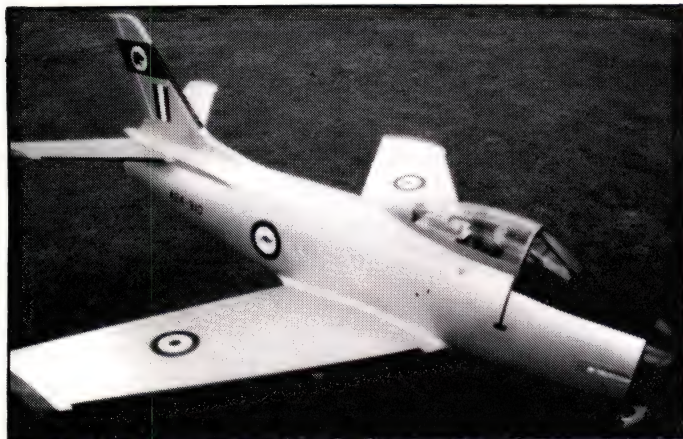
R.J. Model Enterprises

John Mauchline is the manufacturer of RJ model kits. Currently he is producing a large scale Sabre kit in two versions, a BAE Hawk and a Lockheed T33 Shooting Star. These kits include a polyester fibreglass fuselage, foam core wings and tailplane, wing mounting hardware, ply fuselage formers, canopy and balsa parts as required. Designed with the Byrojet Fan in mind, these large models will accept other 77/90 size fan units. The Sabre is available in either F86F or the Australian Avon enlarged version, which allows for plenty of scope with colour schemes. All three types require 200 to 250 feet of grass for take-off and are very impressive in the air.

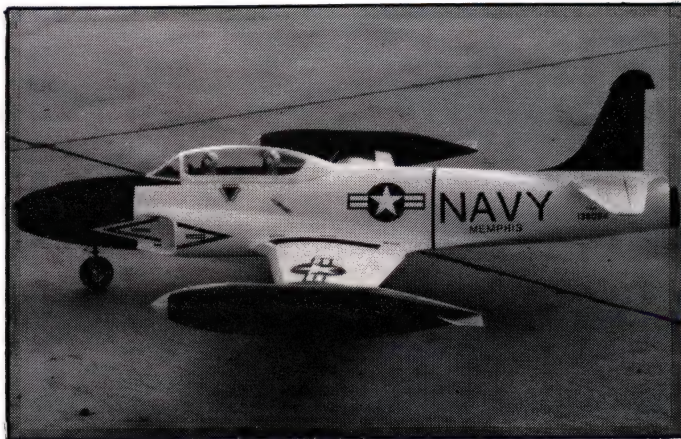
RJ Models back up their models with a comprehensive spare parts listing, as well as supplying Byron fan units and tuned pipes to suit 77/99 engines. RJ Models can be contacted on (03) 842 6241.

JET PILOTS' ORGANISATION

This is an organisation devoted to the ducted fan modeller. Being a USA-based group, it naturally focuses on events and items of interest to



Avon Sabre produced by R.J. Model Enterprises. An all Aussie concern.



T33. Shooting Star by R.J. Model Enterprises. Fibreglass fuselage and wing tanks with foam core wings.



Max Cummin's Hornet, in blue and yellow. Even nicer than the big ones!

US modellers. Currently the JPO has members in about 6 countries. If you would like more information, contact Ralph Bailey, 3088 Bragg Boulevard NW, Orangeburg, SC 29115, USA.

SYDNEY JET FLY

The inaugural Sydney Jet Fly will be held at Marquette Field, RCMC, Pitt Town, on 18 & 19 May, 1991. For information on this event contact Ken Jack on (045) 87 7257.

NOISE AND D.F. MODELS

One of the most important subjects in the aeromodelling world at the moment is noise and how to reduce it. Ducted fan models usually require engines that operate in the higher power and rpm ranges. This usually equates with more noise. Also, our models are usually bulkier than prop driven models, and have intakes and exhausts that can generate more than normal noise due to the velocity of the air flow.

Having said all that, we are also in a good position to reduce noise, for the following reasons:

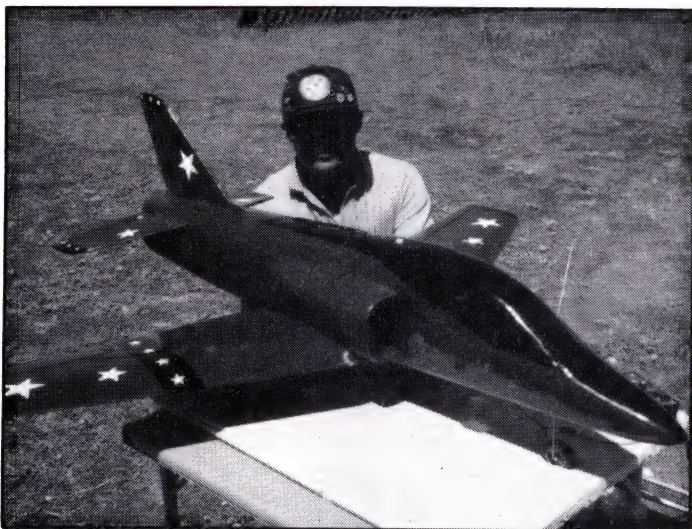
1. The engine is buried inside the fuselage within a duct which itself is enclosed by the outer skin.
2. We usually use tuned pipes, and current developments in this area look very promising for the reduction of noise.
3. The distances forward to the inlet and aft to the exhaust nozzle are usually quite long, which further insulates the fan and engine from the outside world.

I have heard several very fast models using high power fans and engines that are particularly quiet, and at certain angles when the model is in flight, barely audible. On the other hand, most are usually excessively noisy. It is obvious that, with application, ducted fan models should be able to meet most, if not all, present and future noise abatement requirements.

In the future this subject will be discussed further, and we will try to identify the areas where we can achieve significant reduction in noise.



The ugly old Phantom turned into an handsome model by Ken Mollison. This is the F4N version.



Steve Guest with his British Aerospace (BAE) Hawk. Note blue foam sheet used for wheel chocks.



Laurie Bisa with his Sport Hawk.



Precision scale F104 in the AMA Museum in Reston, Virginia. HT alloy on leading edges; titanium spars and tailpipe for after-burner operation. Well, not really! How many oldies in the background can you identify? Photo from John Worth.



Jon Bellamy and his Cox TD 049 powered sort of F16, shown a couple of issues back.

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Weight: 11½ pounds **\$310**

2. North American F86F Sabre

Fuselage Length: 58.25 inch; Wing Span: 57 inch;

Weight: 11½ pounds. **\$310**

3. British Aerospace (BAe) Hawk

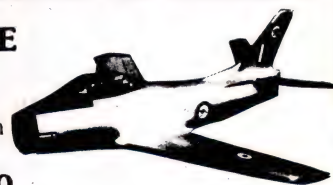
Fuselage Length: 71.25 inch; Wing Span: 62.5 inch;

Weight: 14 pounds. **\$420**

4. Lockheed T33 Shooting Star

Fuselage Length: 75 inch; Wing Span: 80 inch;

Weight: 16 pounds. **\$425**



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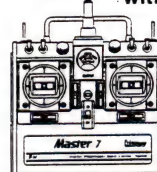
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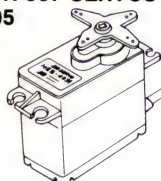
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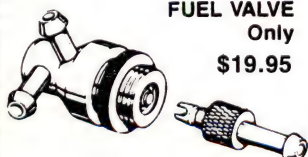
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AIR-104

BYRON Expo 1990

by Ross Woodcock

The expo followed much the same format as in previous years, with the bulk of each day devoted to the flying of Giant Scale models. This activity is split into time slots for ducted fan and propeller aircraft. The time slots are of one hour duration, commencing at 0800 hours. The day's activities cease at 2000 hours.

I would estimate that on the two biggest days, Friday and Saturday, there would have been at least 200 aircraft on the line. As usual, there were a significant number that weren't flown, the owners simply sitting with their models in the pit area enjoying the company of their fellow modellers. Frankly I found, as I did last year, that there were only a few models that were worth a second look, and a small number that were outstanding; the majority were typical Sunday club models that you could see each weekend.

Most of the flying is confined within a large oval traffic pattern (like Shepparton) because of the large number of models flying and waiting to fly at any one time. However, some fellows, as is inevitable, break out and fly with reckless gusto, many paying the price; crashes are not uncommon. One F4 Phantom encountered a glitch that forced the model into a flat spin, with the inevitable result. The only thing that the pilot could do was to shut the engine down.

This year the scale-only rule was relaxed and, as a result, there were a number of non-de-script models on hand, perhaps the most popular being the large Hots models. The expressed tone of a number of fellows suggested to me that next year it will be scale-only again.

The expo does, however, encourage a good showing of ducted fan models of many shapes and sizes (which blows the giant scale picture). Perhaps the darling of the ducted fan crowd was a beautiful little MIG 15, 24 inch span, powered by a Cox TD 09, that flew very well, unfortunately with its undercarriage down. I must say that it took a long run to get off, and I doubt if it would

get off from grass.

At the other end of the scale was Dennis Crook who had three models at the show: an SR 71, an F4 Phantom and the F14. The F14 really interested me because of its folding (swing) wings. This model used spoilers on the wing for lateral control when the wings were extended and the elevators act as elevons when the wings are folded (or is it retracted?). This is an extremely complex model, and Dennis is an exceptionally cautious man who aborted at least six attempts to fly when he detected one motor going off song on the take-off roll. When the model was finally flown it was in a very conservative manner, with the wings extended, except for one run over the main strip when he retracted the wings for a single pass. Somehow I expected more, and was a little disappointed after reading so much about this model aircraft.

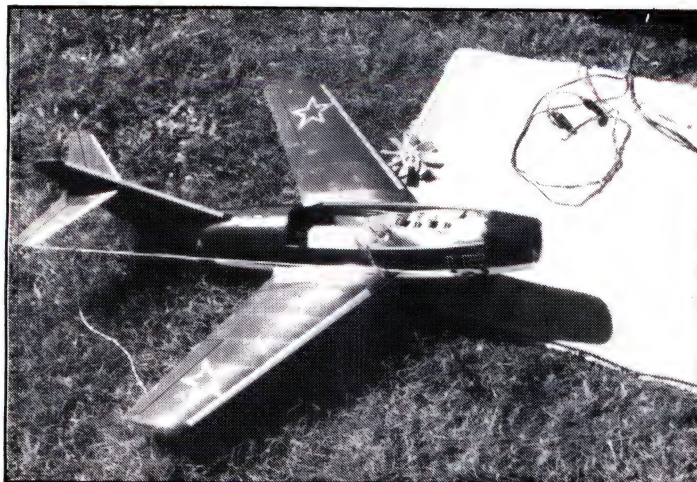
Steve Korney of Hurrican Fans had his latest projected kit model of the Mirage painted in the orange and white of the Australian Research and Development Unit (ARDU) aircraft. As yet this model's paint scheme is incomplete. It's also very unusual to see an Australian colour scheme in such a parochial atmosphere.

Don Neil had a very attractive model of the Curtiss Goshawk built from a modified Barron plan. This model looks as good in the air as it does on the ground.

Another aircraft that caught my eye was the Fleet Sparrowhawk. This aircraft was displayed as one of the aircraft that was assigned to the US airship Akron. The elaborate hook assembly on the upper wing was used to engage a lowered trapeze in flight, at which time it was hoisted up into a hangar (or should that be hanger?) within the bowels of the airship. This was, in fact, an airborne aircraft carrier, the idea being to have on board your own fighter protection. As far as I am aware, this model didn't fly during the five days of the expo.

This year I was fortunate to be able to go behind the Striking Back set and see close-up how it works, which was as amazing as it was revealing. Those of you who have seen the Striking Back video will know that the Japanese carrier Akagi pokes its nose out from behind the island only to be attacked by bombs and torpedoes, eventually to be so badly damaged as to list over on fire, and ultimately withdraw. This aircraft carrier, from the back, is a tangled mess of construction material, with the outward facade on the public viewing side only. A hydraulic jack tilts the assembly to list the carrier when sinking, and the whole affair is on wheels propelled by a tractor and tow bar, all unseen by the public. The sacrificial Zeros on the forward flight deck are each wrapped with explosive cord, and are replaced for each session (obviously). Also, on the back side of the Akagi is a catapult to launch Zeros during the early stages of the attack. To complicate this, the pilots are remote from the launch catapult by some 100 metres, and it's nearly always a downwind launch. Incidentally, these Zeros are launched straight at the pilots, who are stationed behind the next hill, also out of sight of the viewing public. The American carrier, Hornet, is stationary and is, in reality, the garage where the two torpedo boats (also on wheels; the 'Pacific Ocean' is only 6 to 8 inches deep!) are housed and serviced between shows, along with the two tanks. The torpedo boats and tanks are one-man affairs, not radio controlled, which at least helps to conserve frequencies, but it gets very hot for the drivers, particularly as one tank gets hit and the rear end burns in spectacular fashion each day.

Besides the Byron B17, there were 3 others at the expo. Two were, I believe, Westcraft kits and didn't fly. The other B17, of approximately 12 foot span, did fly on at least one occasion. I neglected to record the builder's name but, during discussions with him, I found out that it was totally



MIG 15, all 24½ inches of it, powered by Cox TD .09, by Rob Hahn. Pic by Ross Woodcock at the Byron Expo, 1990.



At the Byron rally, a P80 Shooting Star, Sternier kit by Bob Hill, has Rossi 81 and Byron fan. Photo from Ross Woodcock.



Fleet Sparrowhawk by Ken Perkins. Note elaborate hook assembly used to arrest it into airship as described in the text.



Curtiss Goshawk, 1/4 scale, used Barron plan for basis by Don Neill. Sachs Dolmar 3.2 engine. Big cowl makes prop seem small. R.W. photo.

scratch built, with a number of unusual features, not the least being a solar cell that charges the Rx batteries whilst the aircraft sits in the pits. The only bad thing about this B17 was that it was covered by some form of silver plastic film that was bubbling in the heat. Some people never learn.

The Byron B17, as yet unfinished, was flown at the end of each day's show by Ken Bryan. This aircraft spans 20 ft 8 inches (6.26 metres) and weighs 250 lb (111.4 kg), 43 lb (19 kg) of which is lead nose weight. This aircraft is powered by four Sach Dolmar 4.2 engines. Its flight envelope is very, very realistic. The flaps need to be re-rigged to come down a good deal more, landings as yet are a little hot and a long touch-down on one occasion nearly had the aircraft disappear over the crest of the hill, requiring a ground loop to keep it in sight. (Exciting stuff for the onlookers!)

The air show, commencing at 1600 hours, was a little different this year, as Byron had decided on a few changes. All previous years the Christen Eagles were a major performer. This year, however, they had the Holiday Inn aerobatic team of four Pitts Specials. There was an astonishing comedy act with a Piper Supercub flown by Jim Mynning. Most of the flying seemed to be below ground level; remember, the Byron strip is on the crest of a hill.

Jim Franklin flew his magnificent Waco Mystery Ship. (This aircraft is so pampered by Jim that it's crated to air show sites rather than flown.) One of Jim's acts with the Waco included a wing walking sequence with famed Hollywood stunt man, Johnny Kazian, and his son, Tony, the only father and son wing-walking team in the world. (I wonder why?!). One of the stories told about Jim Franklin is that his father taught him to fly at age eight sitting on his knee. One day, in his father's absence, he took his father's aircraft out and flew it, and was caught only because he was too small to push it back into its hangar. Believe it or not! He officially soloed at age 12.

Another of Jim's acts has him assume the role of ZAR captain of the Starship Pride (a black and gold painted Lockheed Aerostar) to put on a musically choreographed aerobatic routine, with clouds of smoke, of course.

Aviation people say that Leo Loudenslager, seven times US National aerobatic champion and 1980 World Champion, doesn't just fly an aircraft, he attempts to destroy it. The fact that

the expo site isn't directly attached to the airport means that the initial snap roll on take-off, that has become his trademark, is missing from his act. However, he spends the next 6 to 7 minutes making up for its omission.

Of course, the show wouldn't be complete if the parachutists weren't there. Once again these people didn't need a reason to jump, they must jump at least four times a day and, once again, they jumped from a Short Skyvan. One of the jumpers has an artificial leg, which he removes before jumping. Upon landing he inserts an aluminium tube into a fixture on the stump that allows him to gather his chute at the landing site. This fellow's antics removing and installing this tube to allow him to move around whilst repacking his chute (basically a hands and knees job) fascinated me.

Also this year, the Cloud Dancers from Florida did their stuff with their radio controlled model parachute act. Five radio controlled parachutists are dropped from an Islander style cardboard aircraft powered by two piped 60s. This aircraft also has spoilers instead of ailerons. On the last day one of the Cloud Dancer models was released by one of the full scale parachutists from a considerable height, and the small model looked very realistic floating down with the full scale jumpers.

This year Striking Back commenced at 1700 hours, and was pretty much as in 1989. In fact, on the first day we used 1989 sequence sheets. Next year, as it's the 50th anniversary of Pearl Harbour, the show format is to be changed.

In show business the saying at rehearsals is "it will be all right on the night". Unfortunately, at Byron they don't rehearse, and Wednesday's show is curtain call and rehearsal all in one, and, as such, things are expected to go wrong, and, as usual, they did. Everyone dreads Wednesday's show. Jim Franklin's act has some ground fired pyrotechnics and, apparently the launch angle was too shallow, with the result that portions of the smoking cardboard cases lobbed into the pit area. The atomic bomb explosion (affectionately called the Nuke) went off unexpectedly, and portions of the blow-up Zero dropped into the pit area. This blow-up Zero never ceases to amaze me. This is a sacrificial model that is blown up each day; five days - five models. These models are very basic Byron Zeros; no rudder control, no undercarriage (it takes off on a dolly), no wing covering (just paint-

ed foam), powered by a Quadra. It's armed with smoke bomb, 1/4 stick of dynamite and a litre of petrol, and it flies around trailing smoke to eventually be blown up on cue at minute 17. Normally there is a three second delay between throwing the switch and the explosion, allowing the pilot time to turn towards the set away from the crowd line. Wednesday's model exploded instantly; you can bet there was 'heavy mention' of this in Thursday's briefing.

My job this year was on-line co-ordinator of the bombers. I was in radio contact with the director to ensure that the aircraft got away on time, that the pyrotechnic guys knew which aircraft was making a run on what target to co-ordinate actual bomb drops with explosions, and to inform the director if we struck any on-line problems, which we did on two occasions. Two days running the C47's rudder went out as Ken Bryan prepared for take-off, which just goes to show that it doesn't matter how professional your approach is to each task, if something can go wrong, it will.

Each performing pilot has a caller-observer, to keep an additional pair of eyes on the action, to ensure that the pilot knows what's going on outside his sight frame. Despite all this, because of the action, explosions and resulting smoke, it sometimes happens that aircraft come very close together and it's almost inevitable that there will be collisions. In 1988 two B25s collided, causing the demise of one and the amazing save of the other. In fact, the one saved was the one out here in 1988 for the Bicentennial Air Show. This year Paul Edmonds, flying a Zero, clipped the left rudder of Ken Bundt's B25, damaging the fin and almost removing the rudder. Neither Ken nor I saw the contact, and Ken was unaware of it until I noted that something looked odd. The B25 carried on as though nothing had happened.

Once again Margaret and I stayed with Ken and Phyllis Bundt, who are fantastic hosts who go out of their way to ensure a good time. Of course, Margaret and Phyllis visited quite a few shopping malls and ice cream parlours. I believe that Phyllis knows every ice cream parlour between Ida Grove, Iowa, and Omaha, Nebraska.

The Byron Expo takes place during August, the northern hemisphere summer. It's hot and, if you stay out in the sun, you are going to get burnt. Take a hat and sunblock cream and enjoy yourselves.

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ASP 12

Engine Review

Manufactured in China

Distributed in Australia by Australian Model Aerodrome, 367 St. Georges Road, Fitzroy, Victoria, 3068.

Introduction

The ASP range of engines is being extended, and the latest one is this small capacity motor that has the main features of the larger models, being a twin ball raced, ABC, side exhaust two-stroke. The throttle is a sliding barrel type, and the muffler is a simple expansion chamber.

Specifications

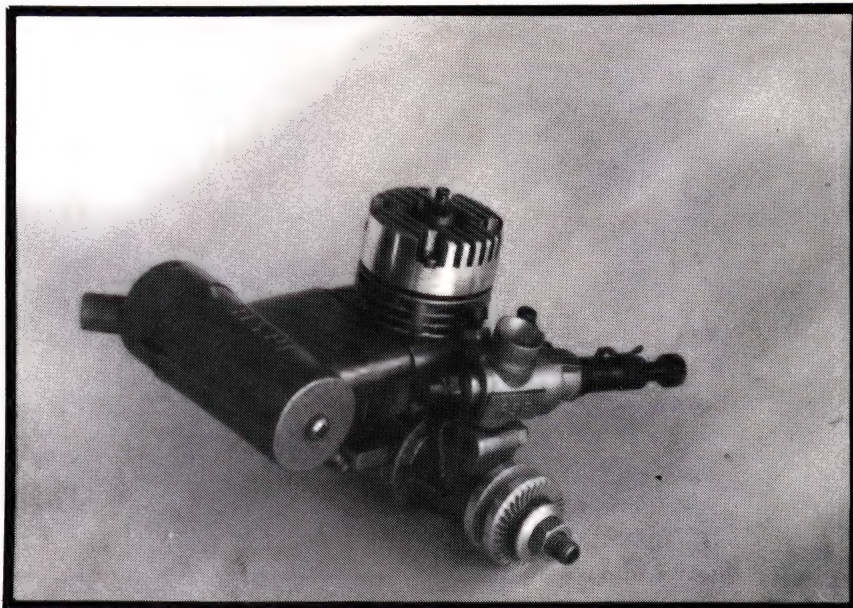
Bore: 13.6 mm
Stroke: 13.0 mm
Capacity: 1.89 cc (0.115 cu in)
Weight: 170 gr
Fuel consumption: 7.5 ml per min at 17,000 rpm

The **crankcase** is a smooth-surfaced pressure die casting with sturdy mounting lugs, throttle boss and muffler mounting manifold. It is embossed on one side with ASP, on the other side with 12, and under one mounting lug with Made in China. The front crankshaft housing is quite short, putting the throttle close to the prop disc, but this caused no problem with engine handling. There were no fuel transfer ports in the cylinder.

The **backplate** was a casting and retained with 4 screws. It was a very close fit in the case and no gasket was used, nor was it needed.

The cylinder head was machined aluminium with deep finning and retained by 4 screws directly on top of the cylinder liner flange. The combustion chamber was a shallow bowl with a very narrow squish band.

The **throttle** was a very neat casting. It had a sliding, rotating barrel, two mixture screws and main needle, a throttle stop screw, a large brass fuel nipple and a metal throttle control arm. The **needle valve** had a fine thread, an O ring seal and a very strong ratchet to retain the needle setting. The needle knob was drilled for an extension wire retained by a grub screw. The throttle was held in the crankcase boss with a clamp screw and sealed in place with an O ring.



ASP 12 has compact appearance. Motor is only 63 mm high and 72 mm long, although prop shaft is a bit short.

The venturi diameter in the throttle barrel was 5.5 mm.

The **piston** was a casting with large gudgeon pin bosses. The gudgeon pin was short and retained by a wire circlip deeply recessed into the piston on each side.

The **conrod** was aluminium alloy with one oil hole in the big end.

The **cylinder liner** was chromed brass with a very substantial wall thickness of 2 mm. The fuel transfer ports were cut into the walls of the liner for the full depth of the liner so that the fuel flowed up into the cylinder between the crankcase and the piston! The only discrete port in the

liner was for the exhaust, and quite large at about 9 x 4 mm. There were three transfer ports, as for the Schnuerle system, and the port opposite the exhaust was angled less than the flanking ports. All three opened at the same time.

The crankshaft was probably hardened steel, as the only highly finished surface was on the pressed-in crankpin. The crank web was cut away each side of the crankpin. The shaft was stepped down to 5 mm for the propeller, which was driven via an aluminium collet on the shaft. Two ball bearings carried the crankshaft.

The **muffler** was a plain cylinder with a removeable endcap that had an angled exhaust outlet. The two parts were held together by a single screw with a gasket between them. The muffler was attached with two screws tapped into the muffler and sealed with a gasket. The brass muffler pressure nipple was at the front and underneath the muffler.

Overall there is only one feature that makes the ASP 12 stand out from many other 2-stroke glow motors, and that is the transfer ports in the cylinder liner instead of the crankcase. The external finish was very good, the engine appearing to be neat and functional. Inside there was nothing to indicate exceptional workmanship except perhaps the radiussed edges on the crankshaft ports and the short gudgeon pin.

Performance

It is usually recommended that the first running periods with a glow motor should be with a light



Note the complete cut-away transfer ports in the robust cylinder liner. Con rod big end is not big! Muffler does not rob the ASP 12 of top RPM.

load; i.e. small propeller, and rich needle setting. To do this the throttle on the ASP 12 was replaced temporarily with a free flight venturi and needle valve, and the muffler was not attached.

A Kretchmer 7 x 3 GRP propeller was selected, and it was found that the threaded part of the crankshaft was too short unless the prop washer was omitted. When the engine was started, using an ordinary plug and 5% nitro fuel, it was immediately apparent that it had exceptional performance.

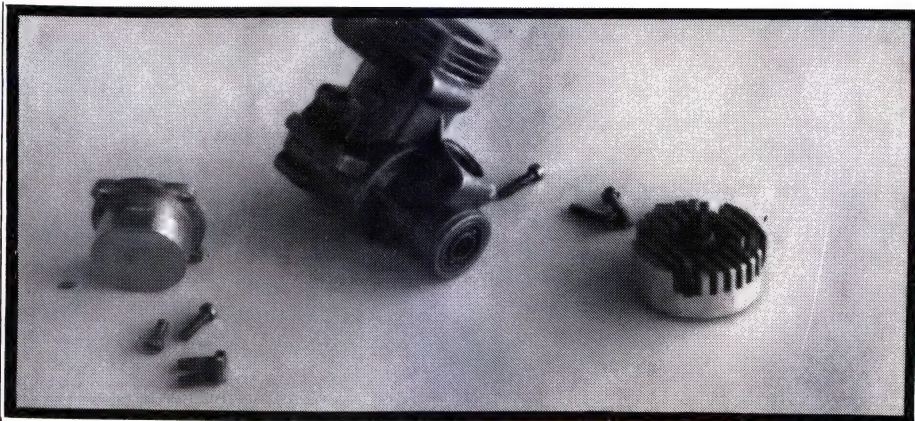
After a few short, rich runs, the ASP 12 was holding 19,000 rpm on the Kretchner prop, and sounding wildly pleased with itself. Furthermore, when the straight venturi was replaced with the throttle, it lost very few rpm, and even with the muffler in place the ASP 12 ran outstandingly well.

Starting was quite easy. It was found that it started better dry when it was cold; but it liked to be quite wet when started hot. Needle valve control response was good, although it was very difficult to hold down the rpm.

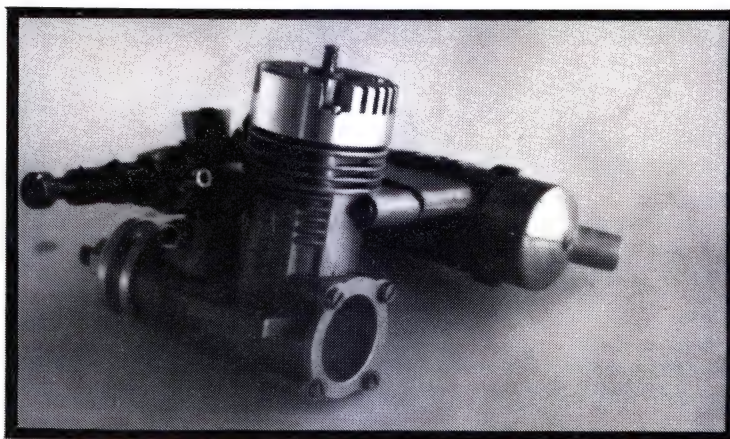
With throttle and muffler in place the following figures were obtained:

Kretchner	7 x 3	18,200
K & W	7 x 3½	17,000
Taipan	7 x 4	16,600
K & W	8 x 3	13,800

It would seem that the radical method of internal fuel transfer in the ASP 12 has resulted in a small motor with outstanding performance. It is small, light and compact, which makes its performance even more impressive. Although it is a high speed engine, it is so easy to handle that it can be regarded just as any of the other sports motors, but it will out-perform all but the racing types that are much heavier and much, much more expensive. This is a brilliant engine.



Backplate, crankcase and cylinder head are produced by usual methods, nicely finished and with excellent fits.

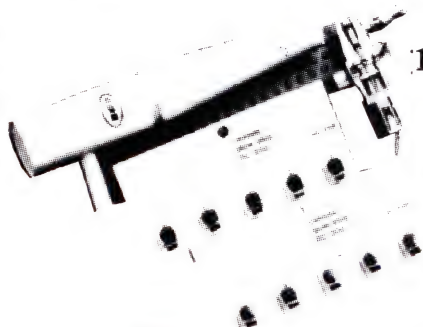


Needle valve and muffler appear large on this neat engine. Slot head screws to be replaced by Allen key socket heads on production ASP 12s.

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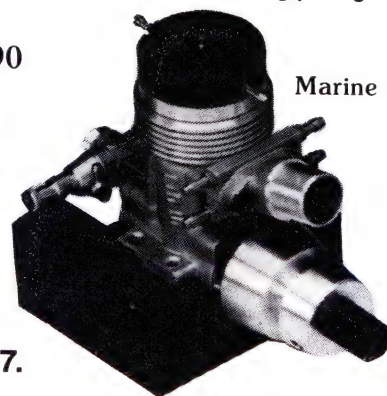
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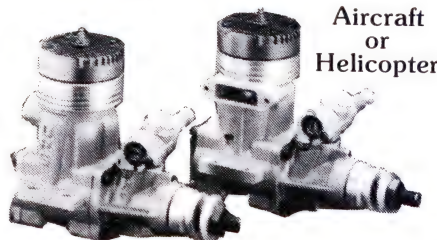


Marine

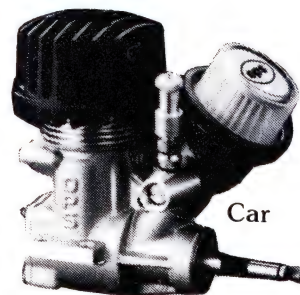


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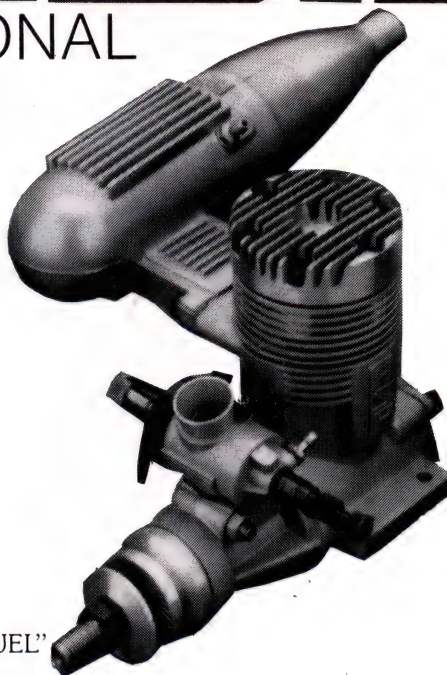
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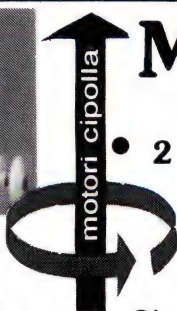
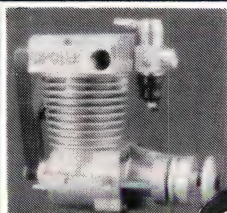
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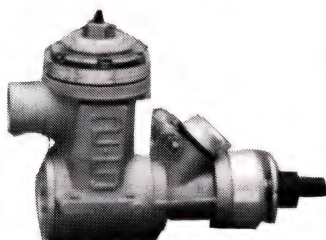
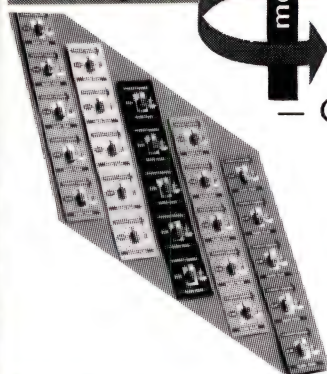


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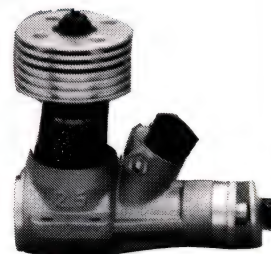
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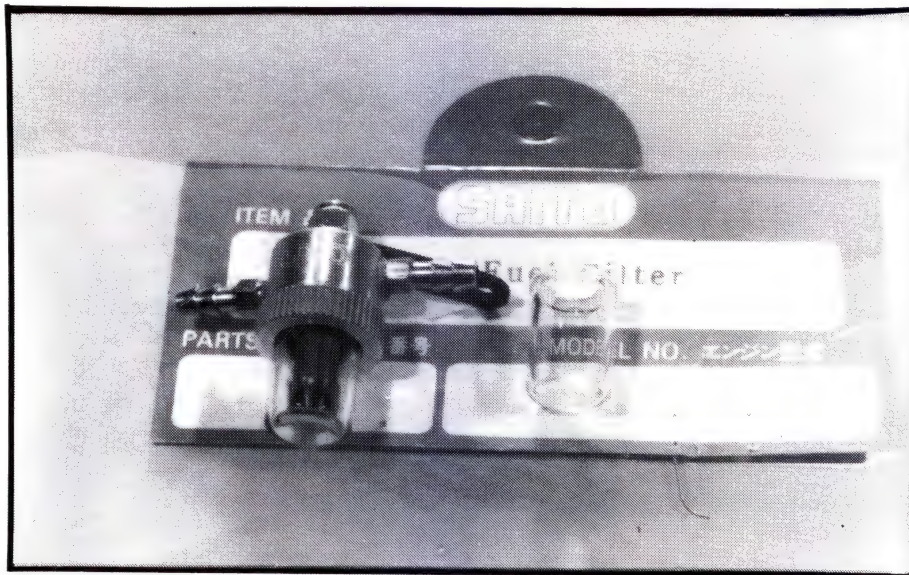
Stamped, self-addressed envelope for SPEEDWINCH replies, and PLEASE print your name under the ant tracks some of you claim is your signature.

BIG TROUBLE

I have just put the phone down after speaking to the chief pilot of this paper pterodactyl (STD at my expense, I might add), telling him that I would forego my column this issue as I needed the space for three engine reports. He mumbled something along the lines of "... just give us a few lines about stabbing your foot with modelling knives and a tech course", which is an odd coincidence as I have just finished a course on hysterectomy, which was about medicine in the old days. (History, see? No? Forget it then.) I just sat down back at the new kerosene powered word processor I am testing when I noticed a bundle of photos. "Hey goodness!" I exclaimed, "I forgot about the bundles of new goodies I wanted to bring to your attention!" If you are now going to read about some new stuff, you know the Editor found room for me.

On a moderately serious note, I do have quite a few products in a general engineering model line offered to me for mention, but I cull a lot leaving only those that I consider to be of good quality and value. The rest are politely refused. Nothing but the best for Airborne readers.

First away from the gate is the **Tatone Fuel Shut-Off Valve**, and this is the answer to many problem applications. Designed for RC models, free flight, pylon racing, rat racing, powered soarers, boats and cars, according to the card, but they missed one important use, and this is a winner - Texaco models. A neat unit weighing 19 grams and small enough to fit into that tiny space you have next to the fuel tank. A very light wire trip sets the unit and cuts it off for instant engine shut-off. Precision quality. Mine came



Saito fuel filter and spare glass bowl. These goodies are from the northern hemisphere, hence the reversed type. Work just as well down south, tho'!

from Kellett's at Liverpool.

The boys (and I use the term loosely) from Hobby Headquarters at Kirrawee were jumping up and down about some new lines that they claimed were the bee's knees, so I put them to the test. The following is a sample of some of the goodies available. Full range of **Zinger Props**, which means all the BIG sizes. I used a couple of the big blades to test the Saito 300 (excellent balance and performance), then my wife claimed one for a ceiling fan. (Not so good; the noise of the Saito in the ceiling drowned out the tele.) If wood props are your bag, Zinger has your number.

A lot of calls I receive in relation to the use of

synthetic oil are based on the modellers' dislike of exhaust goo on their models. (The Clean Clan, in opposition to The Oily Hand Society?) Castor does have a tendency to spread itself around a bit, but that is what makes it the perfect lubricant for our model engines. Rather than cut down on lubrication, redirect the goo with a **Tetra Silicone Exhaust Pipe**. Different inside diameters in a grey silicone tube permanently bent at 45° to go on the end of your muffler. The 10 mm i.d. one that I tested is 75 mm long and does a great job of redirecting the fluid yuk well away from the model or over your mate's boots if he is too close to you in the pits. Attaches with supplied nylon lock ties.

The Hobby Headquarters hacienda (shop where the workers sleep) is now the appointed agent for **Robart** products and the **Pacer** range of products. What this means to you is that **Zap Adhesives** - one of the first on the market - are brought into Oz in small batches direct to HHQ to assure absolute freshness, which means longer shelf life for you. Great stuff, but don't pick your nose while you are using it in case there is a drop on your finger. Imagine going to the doctor with your finger stuck up your beak!

The Robart cattle dog - err - cattel - err - book of things they make, is like a wish book of goodies. They are constantly upgrading their products, and I have been checking out their **Steel Pin Hinge Points**. The hinge point is a superior hinge for movable surfaces on models in that it has no measurable resistance in itself to bending, is installed in a simply drilled hole as opposed to a slot, and the parent body (your model surface) will destruct before the hinge will pull out, providing that you install it as directed. Three sizes are available, starting at the 1/2A for lightweight models, doors, canopies and other



Robart steel point hinges and universal drill guide.

openings, then the regular size for mid range models, finishing off with the super size for large and 1/4 scale models. The linchpin of the unit is a steel rivet that would not break in model applications and would not wear out before the balsa crumbles in the model. HHQ are bringing them in in bulk lots and passing on the savings to YOU. While you are buying your cornsack full, check out the sockets for them, which are perfect for removable items or for removing hinged surfaces for painting, further construction and repairs. To guarantee that you drill the hole accurately for these hinges or guides without the need for marking out centre lines, check out the **Drill Jig-Guide**. Self aligning, adjustable for all surfaces and complete with two hardened steel bushes for both drill sizes needed. Super special price if you mention the Winch name.

When you remember all I have told you about filtering the fuel before feeding it to your engine, consider the **Saito Fuel Filter**. Not only does it look like the real thing, but it is the most efficient that I have used. The filter in it is a 120 mesh, which is fine enough to stop water drops in non-absorbing fuel (petrol and diesel; methanol absorbs water) so nothing is going to get through to block up the finest needle jet. Apart from the style, I like the hardened glass filter bowl, which unscrews for easy cleaning. You get a spare bowl in the packet, but I doubt that you will ever need it other than for loss replacement. I gave mine to a Scotty friend to use for serving Scotch hootch to visitors. (Is that a discriminatory remark?)

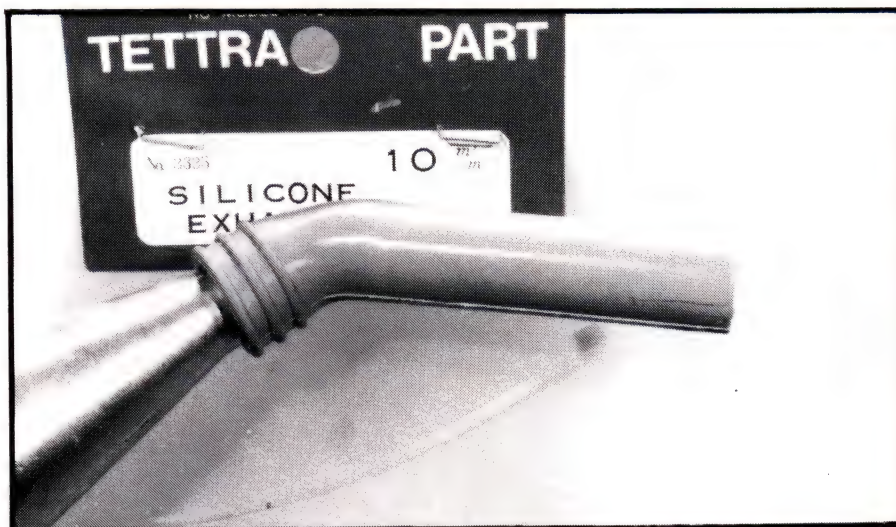
I was going to give you some information on Les Bolly type **Propellers** this issue, but I received a few more sizes half way through the test, so I will leave it till next issue to give you the good news. In the meantime, buy a batch, as they are the cat's pyjamas in efficiency and quiet operation.

Well, as directed by the chief pilot, here's the tip. If your modelling knife jumps off the table, don't try to catch it, as it will certainly inflict a wound. Step back and let it fall freely. The blood from any wound is always a problem when building, as it hinders the drying of most adhesives and leaves blotches under the covering. If sitting at the bench and it rolls into your lap you might experience a totally new experience (said in a

false voice). I have a simple plastic tray on the bench and make sure that I always return sharp objects (when I am allowed to play with them) to the tray when I have finished each cut. This habit also ensures that I can always find the modelling knives, so it is a bit of a bonus.

Well, I hope the boss can squeeze all my offerings in, as I have had some top engines and products for you. Some interesting letters for next issue, as I will have more space. While you drool over the merchandise, I'm off to tech for a course on horology which, I think, is about haunted houses, but I don't know if I will have the time to find out before I start. Help me out by checking your lexicon.

Alf Abbott



Don't dirty up your fuselage. Redirect the exhaust goo onto the model parked beside yours or, if you have scruples, onto the ground.



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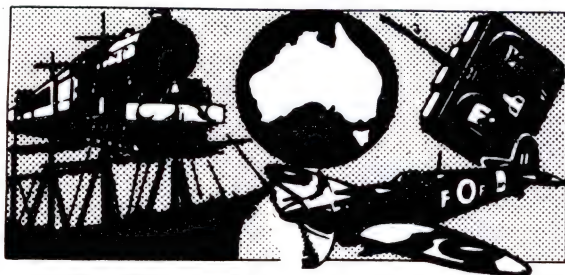
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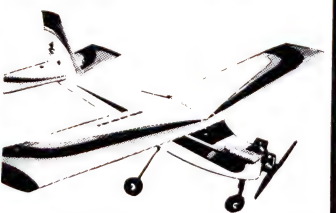
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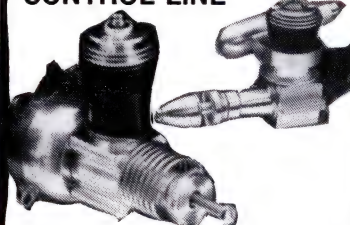
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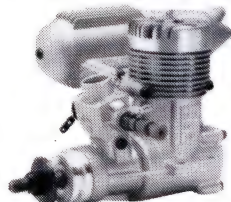
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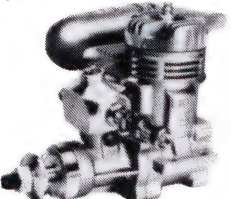
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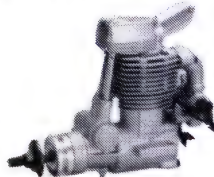
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ELECTRIC FLIGHT

By Phil STEVENSON

NATIONAL ELECTRIC RALLY Easter 1991 — Wangaratta

After the success of Wangaratta last year, we will be returning in force for a longer weekend this Easter. Ray and Erica Pike are the organisers (PO Box 220, Oxley, 3678; (057) 27 3446 [AH]), and with 4 days the event list has been extended to include: F3E Handicap (FAI, 10 Cell & 7 Cell), 7 Cell Glider, Open Electric Glider Duration, Sports Cabin Old Timer, All Up Last Down, as well as 7 Cell Pylon, 5 Cell Mini Pylon, ARF Pylon and Indoor RC. Of course, any other electric models - sport, scale, aerobatic, helicopter or solar are welcome, and times will be allocated for fun flying. The competitions will start at 1230 on Friday and finish at about 1430 Monday. There will be a BBQ on Friday night, a dinner on Saturday night and another BBQ Sunday night before the indoor event. Pre-entry is required so that bookings can be made for the dinner on Saturday. Ring Ray for more details and for an entry form. See you there.

BENDIGO NATS F3E

As expected, the entry level was low; in fact, the minimum of 5 to allow the event to be contested. Also as expected, Peter Pine appeared with the only full house 27 cell model and, of course, easily won the event. The remaining 4 flew 10 cell sized models, with Ray Pike winning this sub-event with a new 2 metre aileron model using a borrowed Geist 70. The feature of F3E was the audience, which seemed to appear every time Peter flew. The awesome power and magnificent speed and glide astounded many who had not seen it before. Peter completed his final 5 minute duration task using about 35 secs motor run (instead of his normal 5 to 12 seconds) but included an amazing aerobatics routine. Interest in 10 cell F3E seems to be increasing, with several onlookers and others planning models. We hope to include the event in the next National Electric Rally.

7 Cell Duration

From an entry of 22, only 15 flew. The day was the first cool one for a week, and some overnight rain meant that lift was very scarce. But competition was very fierce, and in the end at least half the field could say that they were within reach of the winners. Despite the conditions, motor runs of about 35 seconds were necessary to win a round, although I saw Phil Whitely win one round with only 17 seconds when some slightly positive air drifted through.

At the end of the day Richard Tapp was on top with some good flying and a relatively large 2 metre model and Geist 35 motor. Peter Pine was second with his well flown and strengthened Mini Challenger and Hectoplett, while David Hobby gained third place with a Mini Challenger and Astro Cobalt. Very close behind were Mal Pring, Phil Whitely, Scott Lennon, Ray Pike and



Alan Beck's 1/4 scale Cub with Geist 150 and 28 cells. Nice big model, gentle flyer, taking off in rough wind at the Armidale field. Photo from the columnist.

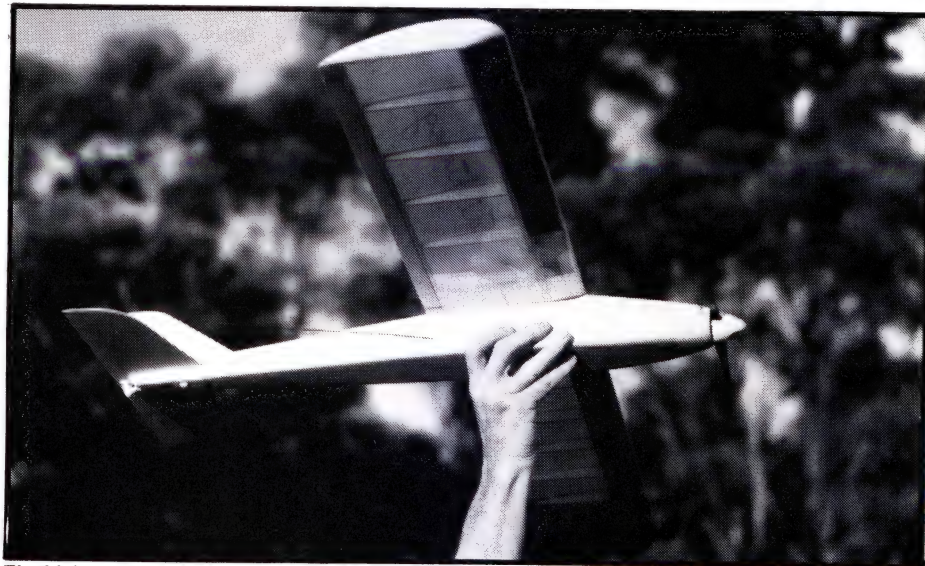
others, with a collection of models varying from 1.5 to 2.2 metres and motors as simple as a Kyosho 360 PT. The closeness of the event was amazing, and the results these days hinge on just a few seconds of motor run, or lack of it. The climb rate of these little models is now very impressive and yet they are still good fun soaring models too.

Product Review AEROFLYTE CONDOR Electric Powered Sailplane

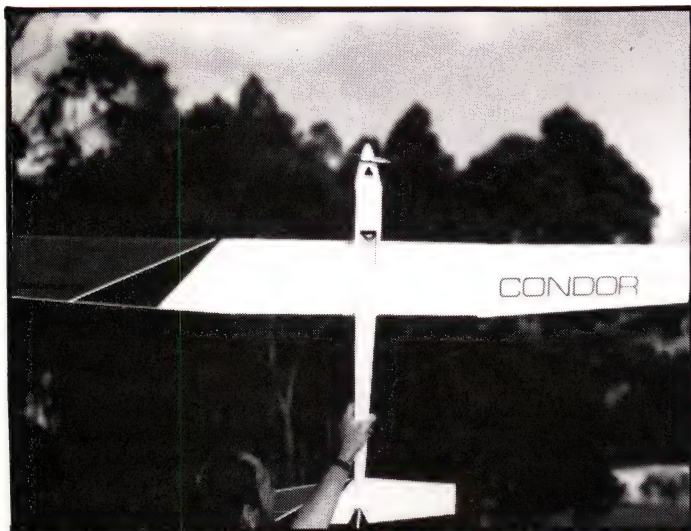
As I stated last issue, my initial impressions of the well presented pre-fabricated model and bright packaging were favourable. To start with I'll cover again the background and concepts

involved. The model comes from the same Australian factory as the Domino, and like that smaller forerunner, is built substantially using a laminated plastic-foam-plastic board about 3 mm thick. This board is doubled for the tail surfaces, and is wrapped around low density polystyrene foam cores for the wing panels. The fuselage has a substantial and fairly conventional wooden structure forward, which is again wrapped with the foam board laminate. In all cases the foam board is basically bare white, with decorations already printed in place. There are a few extra peel-back stickers included, but not the acres usually included in Asian kits.

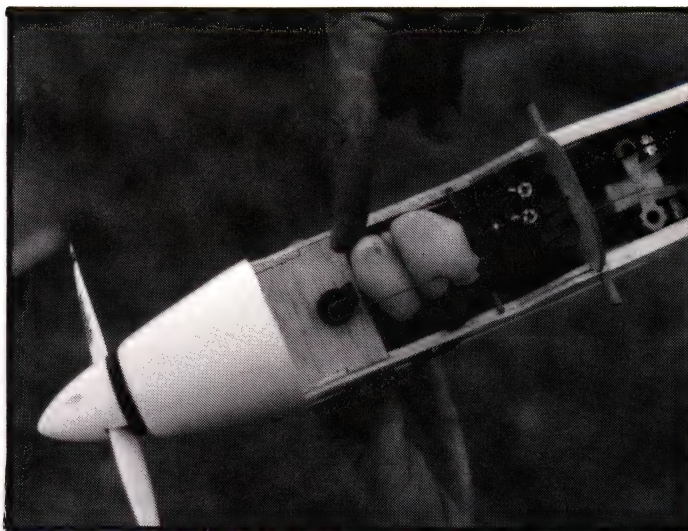
The wing is supplied in 3 pieces, the centre



The Lightning, built in just three evenings, and still an albino! Great fun to fly. Clean lines, compact dimensions. Stevenson pic.



Underside of Condor showing battery access hatch is placed at the balance point. Colour decoration to starboard is green and red.



Nose of Condor showing extra switch for on-off, operated by elevator servo. Note that pushrod moves some distance before tripping switch lever.

panel of which includes a pinewood spar. The 3 pieces need to be joined with the braces included and epoxy glue. The tip panels are provided with a few degrees of built-in wash-out. The tail also requires gluing to the fuselage.

Assembly of the components and installation of the gear took just a few hours. Everything fitted well, and the instructions were more than adequate, even for a beginner.

The motor, mount, prop and switch harness included are the same as supplied with the Domino. This represents the absolute minimum in gear for this large, 2 metre span, model. Aero-flyte obviously aimed to this level to keep the price low, but there is a danger here that some purchasers might be disappointed by the performance if, for example, their nicads are not up to standard, or even if they are flying in regions of higher altitude and thinner air.

I completed the model as per instructions using a two channel radio loaned for the purpose. I was reluctant to fly with no motor control whatsoever, so rigged up an extra switch in series with the supplied wiring harness and operated by extreme up or down elevator (see photo). There are better commercial electronic units available from Astropower, Hi-Tec and Keith Emery for other users of 2 channel RC gear.

The model weighed the recommended 1.6 kg, which I thought to be a bit heavy for a 2 metre, 6 cell sailplane, especially with a minimum standard 540 size motor. However, I charged up and went flying.

As expected, the climb was not exciting but a gentle, relaxed tour to altitude. Because of the built-in wash-out, even if the nose is raised to excess the model just mushes with no sign of tip stall; a worthwhile attribute for a beginner. After a minute or two I switched off and found, to my pleasure, that the model soars very well. It was equally as well behaved as it was under power, and tight thermal turns were easy, again with no sign of tip stalling. It flies slowly enough for a beginner. Because I had motor control this climb and glide cycle was repeated twice more before the cells were depleted, and the total flight time was probably about 10 minutes; not bad for a maiden flight.

SUMMARY: A well-built Australian model with good back-up in spares and so on. It is, however, a bit heavy for the motor supplied, so those wanting a more spritely performance should try

a better motor and maybe a folding prop and seven cells. I also highly recommend installing some sort of motor control, even if it is just some sort of auto cut-off device because, even at the subdued climb rate available as standard, a 3 minute motor run will gain a generous height and that might not be safe for a rank beginner.

Kit for review supplied by Southern Model Supplies.

FOOTNOTE: Subsequently I've seen a few more Condors flown, generally by beginners, and these experiences have conformed my earlier opinion that the model is ideal for their purposes. The slow and stable flight characteristics have enabled a couple of flyers to solo in only two sessions. However, as I found myself, the low power available from the standard motor is not adequate in turbulent conditions or in small fields where, for example, the first turn is necessary to avoid trees before the model has gained sufficient height. I saw one Condor fitted with a Mabuchi Technigold motor and folding prop, and it performed confidently in difficult conditions. Hence I highly recommend that those not satisfied with their standard motor should spend an extra \$50 on a better motor.

Product Review MIDWAY MODELS LIGHTNING Electric Pylon Sport

Most electric flying enthusiasts start their RC flying with powered sailplanes, but after a while some have the yen to move into something faster. Some drift off to clubs catering for i.c. powered models, while others move into the type of model reviewed here. As in many things commercial, Australia lags behind the USA in this aspect of electric flying, as witnessed by the age of this design by Jim Zarembski from 1985. However, if my club is any indication, this type of model is on the increase, and this kit seems to fit the bill very well.

Midway Models is Bob Sliff, who is also an electric columnist in one of the US magazines. He also does a few other sport and glider type of kits well worth looking at.

This one is no ARF, but a conventional balsa build-it-yourself kit. The kit materials and plan are all appropriate for the model and type of modellers targeted. There are not the elaborate instructions required for a beginner, because firstly the design is very simple and secondly it is definitely not a beginner's model. The design



Phil with the Aero-flyte Condor showing that model is a good size for performance and easy transport. Trees in background require good circuit planning!

is aimed at an Astro 05 Cobalt with 7 x 800 AR cells. I chose to use a HKC 540 modified motor and 7 x 900 SCRs, so the first alteration was to open out the bored hole in the nose block to 540 size diameter. Everything else went together as intended and, in fact, using Ca glues, I completed the entire fuselage and wing structure in one Tuesday night session of 3 hours. The Wednesday night I sanded everything, hinged the ailerons, covered the wing and doped the fuselage and tail (2 coats). Thursday I installed the motor, servos and gear, checked the systems, CG and so on, and Friday evening (daylight saving) I took it flying. A 4 day model!

Maybe because the 540 is heavier than the intended motor, or because I do not cover wooden fuselages and tail elements with film, the model ended up nose heavy, so with a couple of ounces of lead in the tail it tipped the scales at 900 gr.

What fun to fly! First, responsive, but also well behaved. At 960 mm span it has generous wing area for its mass so it can pull tight, high G turns

without flipping over. The motor draws 20 Amps static, but must unload somewhat in the air. But even at this moderate power, inside and outside loops are a breeze. Inverted flying and manoeuvres are not as clean as upright ones due to the non-symmetrical airfoil which, in turn, is useful elsewhere in slowing down the glide and landing speed.

The Lightning will do all the aileron-elevator manoeuvres, and if you wish you can put in a rudder servo and do the rest.

All fuselage access is under the wing, and with 900s this is a bit tight, so I would recommend other builders to put a hatch in the fuselage top behind the wing for elevator servo and Rx. This might also help the CG problem.

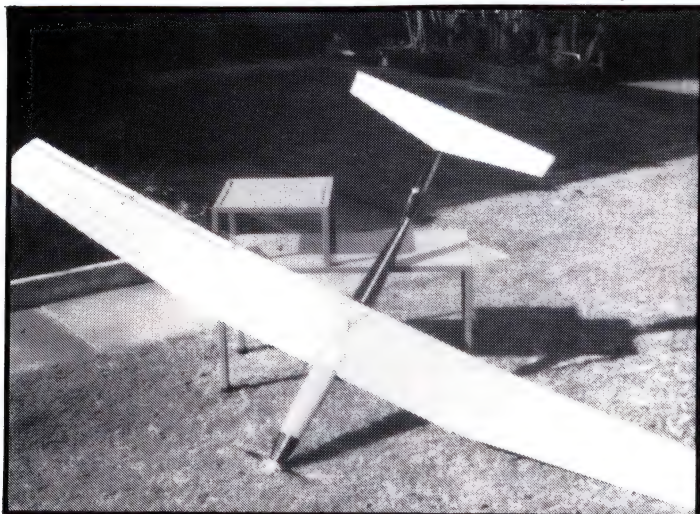
SUMMARY: A simple, fun model with good returns in the fun:construction time ratio.

Motor and kit supplied for review by Electric Wings, Chatswood.

HIGH FREQUENCY SPEED CONTROLLERS

In the December issue of Model Builder there is an article by Bob Boucher, co-founder of Astro-


flight, a guru to most American electric flyers, espousing the virtue of speed controllers with high frequency switching. There was a similar exposition by Bob Kopoki in the AMA's magazine, Model Aviation, recently. It is nice to hear that the Americans have now caught up with the rest of the world. We first heard these ideas expressed in Peter Blommaart's Ampere Flyer in the early 1980s, and in Airborne back when Jack Black wrote this column. All serious European designed electric flight controllers since the early 80s have used 2000 to 5000 Hz switching, and the presence of Hans Sommerauer here for a few years allowed us also to enjoy those benefits. I reported here in 1988 on Hans' explanation as to why 50 Hz controllers are damaging and wasteful, and I've seen that article reprinted in an American newsletter. Now that Astroflight have concurred, the frustrations of 50 Hz rattlers may soon be history.



Tom Conroy's HOB 2T with Kyosho 360 gold motor, Astro gearbox, 7 x 1200 Sanyo SCR cells, and home-made 10 x 6 folding prop. Draws 20 amps, about 150 watts for mass of 1.5 kg. Photo from Frank Bell.



An Astropower-Pricerite Flash by Bob Cummerford. Has Astro cobalt 15, making it a spritely fun flyer. Can be flown with ex-buggy motors. Photo from the columnist.



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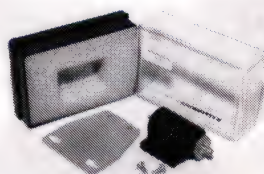
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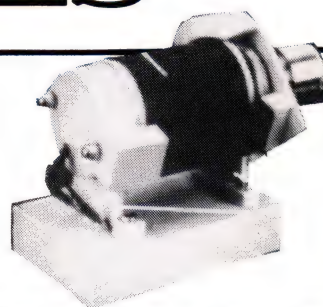
TRADE NOTES



The HHQ Pocket Glo-Starter is now available with 1200 mah Nicad & Charger. This most convenient, economical pocket size power source is good for more than one days activity at the flying field. Rechargeable hundreds of times, fits all Glo Engines, available from The Hobby Headquarters P/L. 14/10 Yalgar Rd. Kirrawee NSW 2232, for \$37.95. Trade enquiries invited. PH:(02) 545 1944, (02) 545 1090 or FAX:(02) 545 1340.



The Perry Aeromotive Oscillating Pump to suit all Glo Engines along with the Regulating Pump (suits High Performance Pattern Aircraft); Regulating Pump 'SG' (suits gasoline, diesel and smoke fluid); are all now available from The Hobby Headquarters 14/10 Yalgar Rd. Kirrawee NSW 2232. PH:(02) 545 1944, (02) 545 1090 or FAX:(02) 545 1340. Coming soon is the Oscillating 'SG' type pump, which will be ideal smoke and gas pump for two and four stroke engines.



The Dave Brown Cordless Starter Pack Kit is now available from The Hobby Headquarters, 14/10 Yalgar Rd. Kirrawee NSW 2232. This handy unit converts almost all 12V starters to cordless operation. Kit contains all connectors and accessories. A power pack consisting of Sanyo 1300 SC cells in heat shrink is also available with charger. Ask the staff at The Hobby Headquarters for their very special deal, including all of the above with the Sullivan Delux 601 Starter. PH:(02) 545 1944, (02) 545 1090 or FAX:(02) 545 1340.



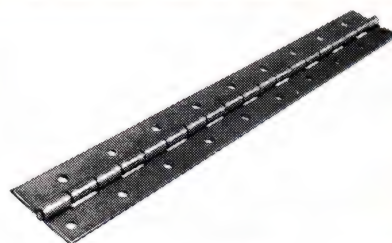
INTERCHANGEABLE HEADS & BASES

A small holding system made up of interchangeable heads and bases is now available for the hobbyist who wants to hold any model during the assembly, cleaning and repairs stages. The vises come in a variety of sizes all of which pan, tilt and lock in any position. Photographs of several models (below) give some idea of the various options. For further information contact Scope Laboratories. Ph: (03) 338 1566, Fax: (03) 338 5675.



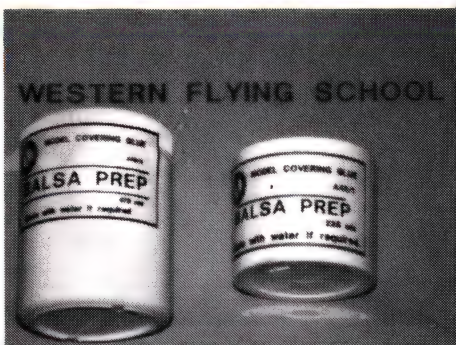
INSTANT HEAT!

A 12 Volt Iron with instant heat and auto switch off has been released by Scope Laboratories. Manual temperature control and up to 150 Watts of power make it an ideal soldering iron for the model car enthusiasts. For those on track repairs, a six metre lead gives you added flexibility. For further information contact Scope Laboratories. Ph: (03) 338 1566, Fax: (03) 338 5675.



Stainless steel continuous hinge - cut to any length. 0.5mm thick stainless steel, 12.5mm open width, with 1/16" mounting holes spaced 10mm apart. The centre pin is easily removed. Suitable for all forms of model engineering - aviation, marine, railways etc. Please enquire at your local hobby shop or contact Scale Aviation direct. Scale Aviation, 101 Angle Rd., South Leumeah, NSW 2560. PH:(046) 25 8162. Trade enquiries welcome.

To make your covering job easier. BALSA PREP is non toxic and can be thinned with water. The heat reactive agent grips covering so that it never moves. Just apply to model frame, lightly sand when dry, then cover. BALSA PREP is an Australian Product. Ask at your local Hobby Store. 225ml or 475ml jars. Rec. Retail \$8.90 and \$14.30. From Western Flying School. Phone (02) 622 9996.



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ATTACK AM 4ch 3x148 servos, mini Rx, nicads and charger

ATTACK FM 4ch 3x148 servos, mini Rx, harness batt. box

ATTACK FM 4ch 3x148 servos, mini Rx, nicads and charger

7UAP Super ballraced servos PCM Rx, nicads, charger 4 model memory

7UHP Super ballraced servos PCM Rx, nicads, charger 4 model memory



7UAP PCM 1024 transmitter with trainer system and RF module.

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9VHP PCM 6 model memory, servos, nicads and charger

4ch mini Rx, 29Mhz

5ch FM mini Rx, 36Mhz.

7ch FM mini Rx, 36Mhz

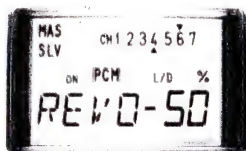
7ch PCM mini Rx, 36Mhz

5ch ip PCM mini Rx, 36Mhz

S148 Servos

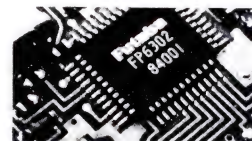
S3001 Servos, ballraced

Harness for above with charge leads



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PRODUCT REVIEW

MODEL AIRCRAFT WING and FUSELAGE COVERINGS

SOLARFILM, SOLARTEX, SOLATRIM, FIBAFILM, BALSALOC

Technical data:

SOLAFILM (adhesive backed iron-on)

680 x 1260 .. 27 inch x 49.5 inch

SOLATEX (adhesive backed fabric iron-on)

700 x 2000 .. 27.75 inch x 79 inch

SOLATRIM (adhesive backed press-on)

330 x 910 .. 13 inch x 36 inch

FIBAFILM (non-adhesive backed fibre - reinforced iron-on)

735 x 1800 .. 29 inch x 72 inch

We at Airborne often receive products for evaluation as our hobby is constantly changing and improving the materials we use in the construction of a never ending variety of projects. Recently we had the chance to look at a selection of covering materials from Dawn Trading who market among many other things the solar range.

The name **SOLARFILM** is known by most of us as one of the first iron-on heat-shrink film coverings and has a solid reputation for ease of use and durability.

One of the problems with some iron-on films, particularly in dark colours, is the tendency to sag on open framework such as a wing when exposed to strong sun. While not affecting the inflight performance a great deal, it certainly doesn't look that good and must affect the torsional strength somewhat. The main thing with all films is to have a properly prepared surface to begin with. A little extra time in preparation will pay off in the final appearance of your model. Fill all cracks and holes and then sand-until smooth, starting with medium sandpaper and finishing with fine. The smoother the surface being covered - the better the finished result. For surfaces other than wood (doped, enamelled, epoxy, fibreglass, plastic) - sand to a smooth matt finish. After sanding, brush off all sanding residues - any dust on the surface will be trapped under the film and show through to mar the perfect finish. Check the sole of your iron for scratches or bumps which could damage the surface of your covering. If necessary, polish the sole with fine emery or wet and dry sandpaper and clean off with thinners WHILE THE IRON IS

COLD. Best is a modellers iron with a 'Teflon' coated sole - do not use abrasive products on a Teflon coated surface. Also make sure the hole is clear of adhesive when changing colours of film as the glue usually provides part of the colour under a clear polymer sheet.

When covering keep in mind to minimise the amount of shrinking needed on the finished product by pulling the film as tight as you can without creating warps in the structure this will reduce the sagging spoken of previously. Also remember to seal around the engine bay on powered models before covering as the fuel residue will get under the covering and weaken the wood in an area that requires its strength to combat the ravages of time and vibration. Recently I observed a model of a very popular trainer that was only a dozen or so flights old do a nose over landing (broken prop, bent nose gear) however on close inspection the firewall had become fuel soaked and had crushed due to inadequate fuelproofing.

The **SOLAFILM** we received came in a variety of new colours and included fluorescent red and yellow (excellent for visibility) violet, pink and clear. I particularly liked the clear for an open framed old timer to show off the structure beneath. **SOLAFILM** has always

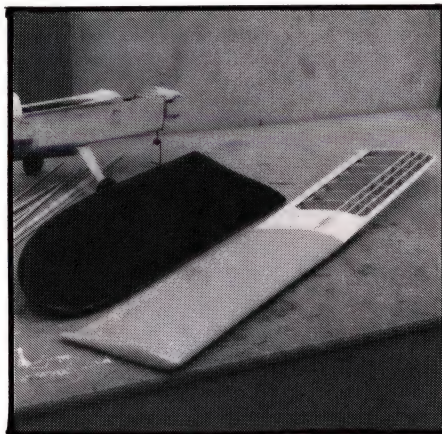
been my favourite as I have a number of models that are many years old and still look good. It goes on easily and gives a tight shiny finish.

SOLATEX is a light, extra fine woven fabric covering material which adds strength and toughness to an airframe. The material is an excellent covering for all types of model construction. The adhesive is active over a wide temperature range and gives **SOLATEX** the advantage that it can be used at low temperatures on foam or veneer or other heat sensitive materials. **SOLATEX** is fuelproof and airtight as ironed on. The product also comes in a long 2m roll the roll supplied was in an attractive linen finish.

The **SOLATRIM** supplied was in black red and chrome. The product has been designed to be used over film or other coverings as a simple method of providing decoration to a model that is only as thick as a coat of paint and is fuelproof as applied. It is simply a matter of cutting out the designed pattern, (letters, graphics etc.) and pressing them into position. **SOLATRIM** can also be shrunk to conform to double curvature using heat from an iron. A matt finish can be achieved by rubbing the **SOLATRIM** with a cleaning powder (say Ajax).

FIBAFILM is a new product which was supplied in a white, blue and polished aluminium. **FIBAFILM** is used just like other iron-on coverings except it does not have an adhesive back. Instead the adhesive (Balsaloc) is applied to the airframe, allowed time to dry and the **FIBAFILM** is ironed in place, glossy side outwards. The application is then as for solarfilm. The advantage of the weight saving of the glue plus the fibre-reinforcing of the film will make it an excellent choice for models such as gliders, sailplanes, vintage or electric powered models which require the covering to provide torsional stiffness. **FIBAFILM** is not however completely opaque so any fillers or dark patches may require a thin coat of paint tinted to match the surrounding surface.

Product supplied by: **DAWN TRADING**



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Available in 18 colours.

GLOSS TEX

Gloss Tex is an iron-on self adhesive fabric covering with a high gloss paint finish. As with other members of the **Solartex** range of coverings, **Gloss Tex** has an active adhesive that can be used at low temperature on foam/veneers and will mould easily around difficult curves.

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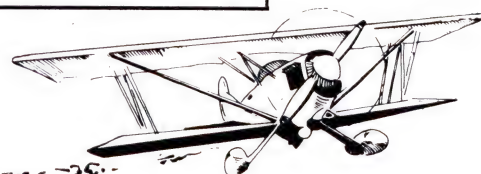
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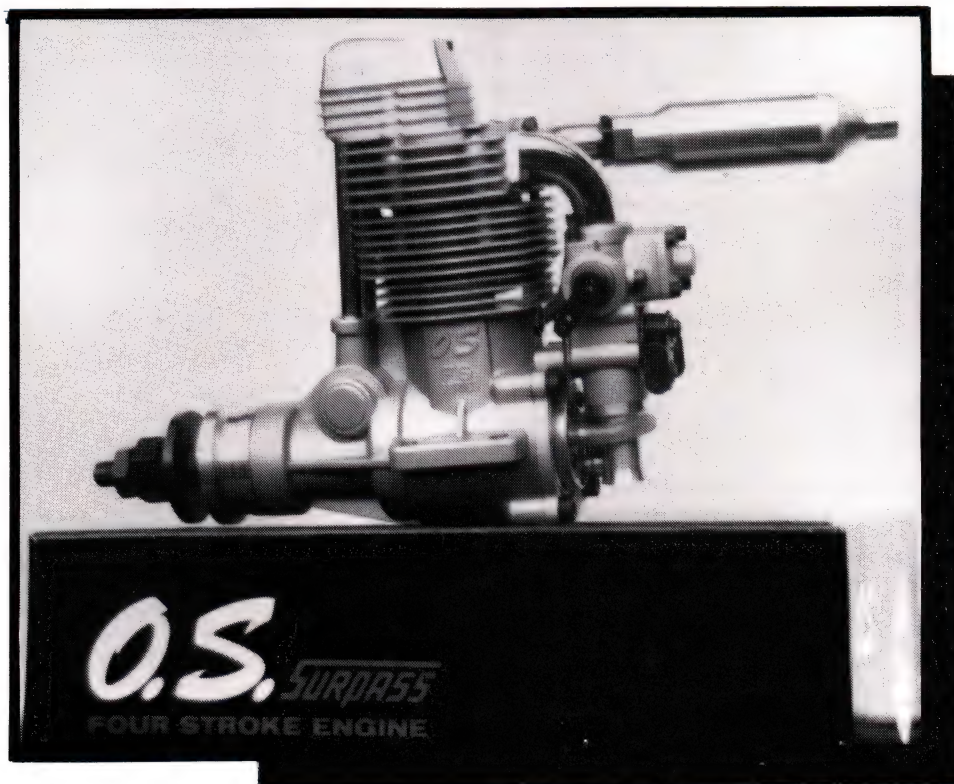
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OS FS-120 SURPASS 2

Four Stroke



Specifications

Displacement:	19.96 cc (1.218 cu in)
Bore:	30.4 mm (1.197 in)
Stroke:	27.5 mm (1.083 in)
Practical rpm range:	2,000 to 12,000
Stated power output:	2.1 BHP at 12,000 rpm
Weight with muffler:	980 g (34.56 oz)
Propeller range:	13 x 11 to 18 x 6
Fuel:	methanol, 16 to 20% castor and/or synthetic, at least 5% nitro-methane
Consumption:	approx 40 cc per minute at 12,000 rpm

GENERAL DESCRIPTION

To say that this engine is a Mark 2 model of the 120 Surpass would be an understatement. Because of the changes made to the pump and carburettor, it would be like comparing a quartz analogue wristwatch to a sundial. We are now into the power and sophistication phase of four-stroke engine manufacture, so you can expect to see some very fancy machinery over the next couple of years. We recently delved into the offering from Saito in the form of the 300 Twin with 2 plugs per cylinder and twin, high performance carburettors, and, I'm sure you'll agree, the experience was a pleasure. Well, this is the offering from OS - twin butterfly carburettor, peripheral jetting, pressure regulated pumped fuel supply and forced crankcase draining. Only the most radical thinker would disagree with the

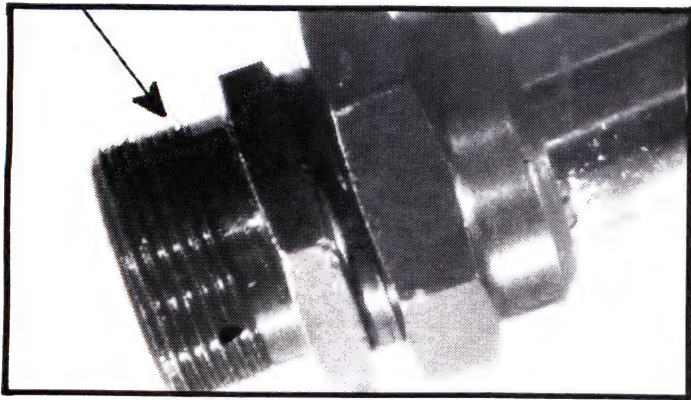
statement that OS really know how to put an engine together. Every detail is considered: performance, engineering, quality, design and aesthetic appearance. If it wasn't such a highly competitive market requiring something new every time you visit the model shop, the OS designs would be in the top selling bracket for a long time without the need for change. However, being as it is, this is the most recent creation in the single cylinder stakes, and it has to be a winner in its field. Considering the sophistication of the fuel system, it is really like a lot of modern home utensils - tried, tested and set up for perfect operation, with a no 'user serviceable inside'. You can pull it apart if you wish, but it would be a wasted exercise as there is nothing to fiddle with and, in fact, you will upset components that cannot be reset in the home workshop. The word is, use it, enjoy it, but don't fiddle. If you are the curious kind, stay with me, as I have pulled most of it apart so that I can describe the inner secrets to you and to deprive you of an excuse to "see what makes it tick".

Eyeglass at the ready? Right ... let's check out the casting work.

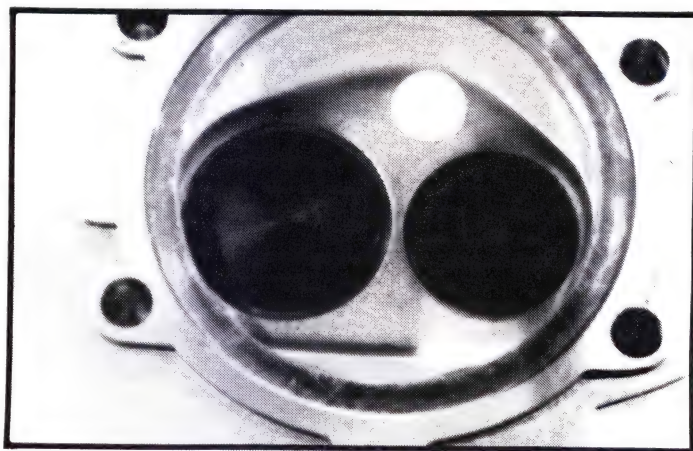
THE CASTINGS

I have to consider new readers or readers who don't read all engine reports when I do these test write-ups. If I didn't I would be able to finish the job in a few minutes, such as now when describing the OS casting work, by saying "as usual - excellent!". In line with such consideration, we will have a close inspection and description and

begin by saying that the quality of the castings is excellent. The metal is blemish-free, no pinholes and the grain structure is so tight that it looks like glass. The maincase casting is light for its size yet robust, with structural integrity enhanced by eight gussets strategically placed in areas prone to abuse damage (unbalanced props and subterranean landings). Finning is fine and deep, giving good dissipation of heat in cowed situations, threads are clean and sharp, machined surfaces could not be improved and the pearl-grey finish is aesthetically appealing. A banjo union in the shaft housing is connected by special silicone tubing to the manifold through which all fuel residue in the lower case is drawn out by manifold vacuum. The head is set up for a screw-in exhaust and a bolt-on intake with valves as large as possible in the shallow combustion chamber. The glow plug hole has been moved across a little from the exhaust valve seat leaving enough metal in between to allow for the fitting of a thread insert in the unlikely event of you stripping the thread. The plug is buried deep into the rear of the head, keeping it well out of the air blast, which would be one of the factors giving the steady, slow idle, as you will see in the propeller figures. The rocker assembly is an homogenous unit in that it stays together when the one retaining bolt is removed, and the rocker cover is the familiar shape with the streamlined blisters. For meticulous modellers, this cover can be given a really high shine with a fine metal polish, and it looks very classy hanging out of



Double safety and exhaust attachment. The locknut ensures that the exhaust system won't loosen and the socket can be left in the head if you wish to fit another type of outlet. Less chance of stripping the thread in the head. (Socket arrowed.)



The combustion chamber. Larger valve is the inlet. The plug hole has been moved back from the exhaust valve.

the model cowl. Other castings are the rear case, carby and piston, and these will be dealt with separately.

INTERNAL ORGANS

The liner is hardened steel with a honed internal finish and a 1.4 mm wall thickness. Light and strong.

OS have the liner and piston combination down to a fine art. The rubbing surfaces have an extremely low drag, which decreases engine operation load and extends the life of the components. This is evidenced by the extended use careful modellers enjoy with these engines. I have done regular check and clean jobs on OS 4-strokes for customers for a long time now, and some of these engines are now into their second hundred hours of operation, with nothing more than a regular clean and decarbonisation of the valve chambers and combustion area. A lot of these 'old timers' are putting out a propeller performance identical to that after initial running-in. Now that's really value for money.

The conrod is machined on all surfaces, and both ends are fitted with bronze bushes. The bushes are deeply cross-hatched for oil retention, and oil is admitted through one hole in the little end and two in the big end. In case you forgot to mark it, the internal chamfer on the big end bush goes against the crankweb of the crankshaft.

The camshaft is a one-piece unit; that is, it is entirely machined from one piece of steel. It includes the shaft, helical gear and two cams. Cams are moderate performance profile with considerable dwell. The dwell is the shape on the high peak of the cam, and this governs the

amount of time the cams are fully open. This unit is hardened and, probably, treated with some type of metal pickle, as it has a shiny finish that is not found on hardened steel without some form of after-treatment. This shiny surface has a purpose; it resists corrosion, and that is a plus.

The crankshaft is a nicely engineered piece of equipment with fine surface grinding evident on bearing surfaces. The crankpin is hollow to reduce reciprocating weight, and the shaft is drilled for some distance to reduce overall weight. The propeller driver is driven by a woodruff key (mandarin segment shape) and the propeller is retained by the OS safety lock nut combination. In this the main nut is tightened and locked in position by a locknut that has a tapered, split extension that fits into the front of the main nut. With this system the propeller comes loose only when a spanner is applied with force to both nuts.

I have saved the piston for last as there are some interesting points. First off, the piston is 30 mm diameter and 23 mm long. With the ring fitted it weighs 13 grams! How and why? The how is due to the exaggerated slipper design and the four large cut-outs in the skirt. The why is because the lighter the piston the less power is needed to push it upwards, and the lower weight reduces vibration from the reciprocating mass. Not only is this superbly cast and machined piston attacked in the weight stakes, the gudgeon pin suffers the same cut-backs. In one piston boss (gudgeon pin bearing) can be found a wire circlip 3.5 mm in from the outside edge, and it is in this position to reduce the length of the gudgeon pin. The pin itself is 21.55 mm long, with a 4.5 mm nylon rub pad which also reduces the

metal length. All this to further reduce top end weight. In case you are wondering, the gudgeon has to be free one end to be withdrawn out the rear of the barrel to allow the piston and conrod to be removed from the engine as well as replaced on assembly. All in all a very interesting method of attacking the weight problem.

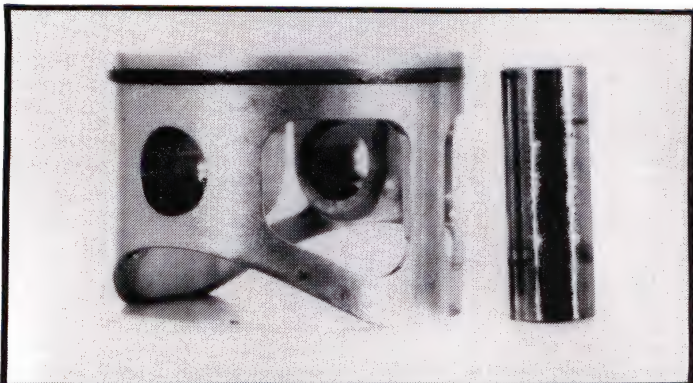
EXHAUST

The exhaust system comprises a header pipe that attaches to the head with a double gland nut system that won't loosen with vibration, and the other end is threaded to receive the 87 mm long muffler that is machined from solid with a welded-on tail cone. Examine the tailcone joint and you will see how aluminium should be welded - superb! For a fleeting moment I was surprised that no pressure nipple was fitted to the exhaust, then sanity returned when I remembered the pump, which is a lead in to:

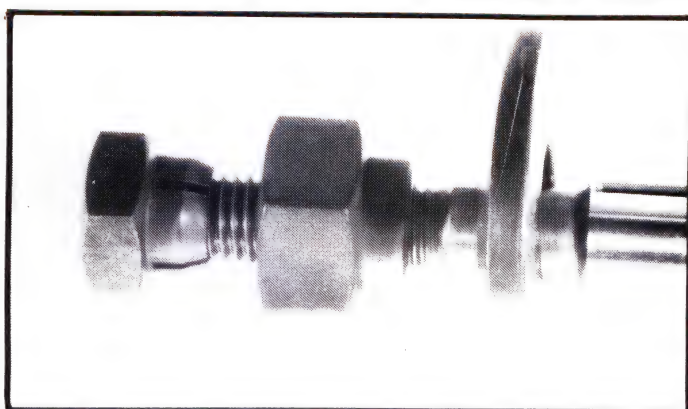
THE FUEL SYSTEM

Here's the new, sophisticated fuel maintenance system that will set the standard. The pump is a sealed unit integral with the rear case, and several changes from the previous model are noticeable. The back of the pump is now flat, with just the nipples and feed banjo protruding. No adjustment is possible or required.

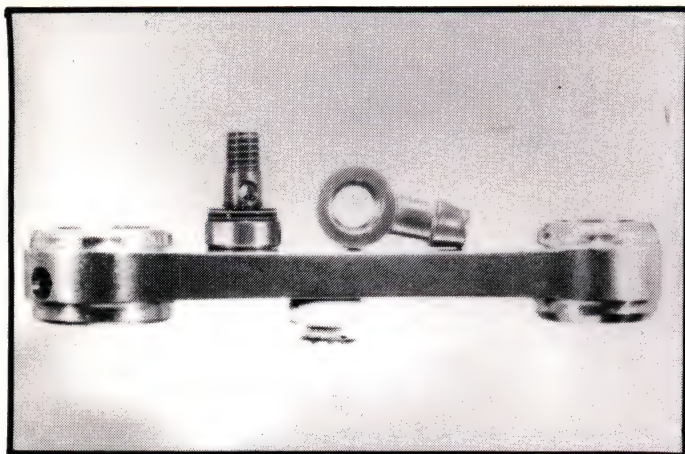
Above the pump is the new carburettor. Starting from the bottom is an extended bell mouth or trumpet intake that is a shrink fit into the choke chamber. The choke is a spring-loaded internal butterfly that is fitted with the extension actuating rod supplied in the accessory kit. Next up is the pressure regulating diaphragm chamber. The fuel is pumped into the inner plenum chamber, flow controlled by the diaphragm into the needle



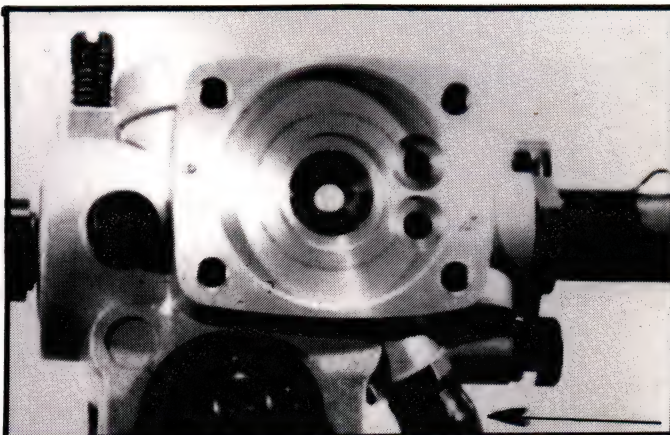
The barest minimum of metal left in the piston to reduce reciprocating weight. The position of the single circlip can be seen inside the boss.



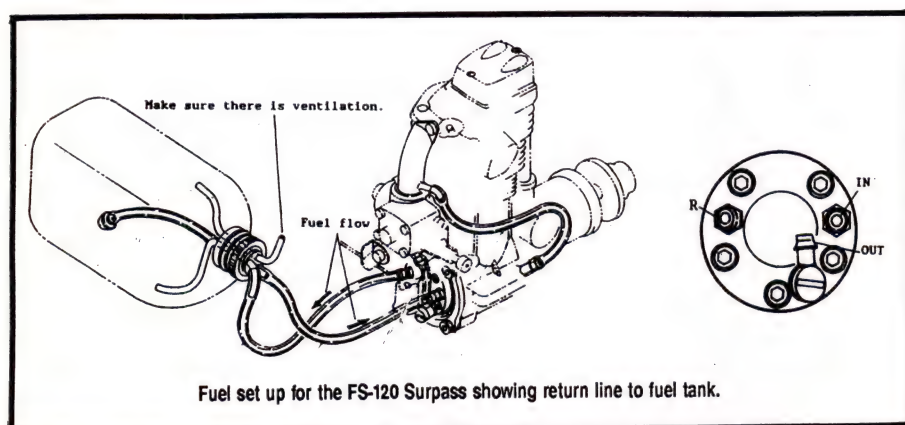
Propellers stay in place with this positive lock double nut assembly.



Fully machined conrod showing the oil hole in the big end. Components on top are banjo fittings for the oil drain on the front housing.



The plenum chamber of the new carburettor. Fuel comes in at arrow, out from lower hole, in through top hole to be metered by the needle. Controlling diaphragm fits over this chamber.



Fuel set up for the FS-120 Surpass showing return line to fuel tank.

Type of model	Size (Dia. X Pitch)
FAI F3A Competition	13 X 11 to 13, 14 X 10 to 11
Scale and sport	15 X 8, 16 X 6 to 7, 18 X 5 to 6, 14 X 7 (3-blade) or 15 X 8 (3-blade)

Note: Smaller or larger props than those shown in the list can be utilized. However, it should be noted that propeller noise will increase as engine r.p.m. increase.

regulated fuel way to the distribution chamber where it travels into the venturi via two peripheral jets and one jet in the centre of the air controlling (second) butterfly, according to the throttled position of this butterfly. The low speed range is adjusted by a limited range eccentric screw in a steel yoke. Idle speed is adjusted by a limiting needle contacting the second butterfly. All this might sound a little complex, but really, all you have to do is adjust the high speed needle, idle mix screw and the throttle stop screw the same as you have been doing in any other carby. The rest is factory set and requires no interference from you and, in fact, no adjustment is possible.

As it is not feasible, as yet, to fit a float chamber to model engine carburettors (inverted flying creates problems), the tank has to be set up exactly as shown in the instructions to utilise the full function of the new fuel management system. After spending a bit of eyeballing time on this carby, it is surprisingly simple in operation while still being a very sophisticated total management system.

BY THE BOOK STARTING

I feel a bit uneasy at times when I get to this section if I have an engine that started first hit. I wonder if some of you might consider that I am glossing the story a bit. I know I am telling the truth, and I see that Clarence Lee in the USA mentions the same thing on many occasions, so I am not the only one. So here goes. To put you on an equal footing with the first start of your Mk 2, I started it by the book; exactly as is set out in the instructions. You know what? It started first flick! Ran like a clock right out of the box. By the time I had 15 minutes on the clock the engine was smooth and holding peak rpm as good as gold. Remember that I only need the engine on song for a few seconds to record a prop figure, so I'm not saying that the engine was fully run-in nor was it giving peak performance as it would after bedding in for an hour or so running. For test purposes it was loose enough to test peak and idle rpm, and starting and throttle response. I had run the engine late in the day so I had to leave it until the next day for the

prop tests, and the start the next day was, again, first flick.

OS recommends a fuel containing more than 5% nitro methane, but do not give an upper limit. I would say that 15% would be as high as you would need to go, with 10% being ideal if you must use it at all. I used Magnum fuel with 5% nitro and the engine ran perfectly. It ran just as well on my own mix without nitro, but the idle was not as good. I did not use petrol in the fuel as I usually do, due to the diaphragm in the carby being of an unknown material (petrol attacks some rubbery compounds). The engine performed flawlessly throughout the tests with absolute instant throttle transition and a remarkably steady, low idle in spite of not having had a full run-in period. The manifold suction on the crankcase works very well, as I found the bottom end components had just a light coating of oil compared to the usual small puddle found in 4-strokes. During the initial running I removed the silicone tube from the nipple and blocked it off while I ran the engine, to be sure that oil was reaching the lower regions. It poured out quite a bit, which is to be expected when an engine is new and the ring has not formed a tight seal. I used the OS F plug for testing and it certainly suits the engine, as I could not detect any pre-ignition and, as I mentioned, the idle was magnificent.

In line with the trend of using course pitch props and propping down for quieter running, I did not get the lower size props for maximum rpm, preferring to test the brute strength, and the tests were most impressive. The following figures were recorded:

16 x 10 Bolly carbon	7,200 rpm
16 x 7 Master antique	8,000 rpm
16 x 8 Master	8,400 rpm
15 x 10 Master	7,650 rpm

The engine idles quite well at 1,200 rpm, but I would set it for 1,500 just to be sure.

POINT OF SALE

Different strokes for different blokes, so you can have your choice. If you like a bit of sophistication, check the pump and carby. If you want power - check the prop figures. If you want a reliable, good-looking engine for sport, scale or pattern, take my word for it. If you want an engine in this size range, why look further?

An impressive bit of engineering.

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SAITO FA 60 TWIN

Modellers around the world have been dropping enough subtle hints for some time. All these magnificent multi cylinder four-strokes are very nice, but what about the modellers who don't wish to fly large aircraft? What about the modellers who can't put their hand in a pocket and pull out four figure sums of money for an engine? What about the modellers who prefer mid-range size engines and have a desire for something new or special? Well, Gen Saito has heard you and jumped the gun again.

I have always found Saito engines to be well made and finished, but this one is really out of the box. The standard has been set and it will be interesting to see if any other manufacturer is prepared to meet the challenge. Believe me, this is one really fine engine! Not only is it superbly manufactured, but it performs as a high performance engine and it is neat and small, only 10 cc, and a twin to cap it off. What more could you ask for?

I still enjoy running engines, but I don't jump out of bed at the crack of dawn to do so as a rule. It has to be something really special to make me miss my second cup of breakfast tea. So it was with this little twin. Worst part was that I could not fit it in my standard engine test equipment and had to make a special rig, as has to be done for any radial mount engine. (I have now rectified this problem, as I learnt from the time spent with the Saito.) Once the rig was made and the engine bolted to it, I set it up in my special clamp stand and the fun began. The engine was connected to the fuel tank, propeller fitted, cylinders primed, plug power connected and the prop was flicked. The engine ... hold on a minute! We are a bit ahead of ourselves. We haven't looked at the working parts and the innovations. Let's rectify that situation right now. Spanners, hammer and chisel ready? Go!

SPECIFICATIONS

The translating chip of the printer had a bit of a short circuit, as the printed instructions are a little awry. Not to worry. Where there's a Winch there's a way and, with the help of my trusty vernier, I have set matters right.

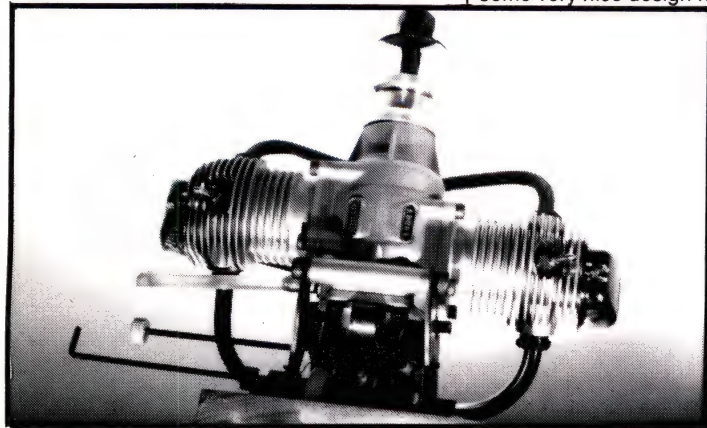
Bore: 20 mm
Stroke: 18 mm
Weight: 760 gm
RPM: 2,000 to 10,000
Consumption: 12.5 cc per min. @ 10,000 rpm
Prop range: 11 x 8 to 13 x 6
Model use: to 3.5 kg and 50 sq dm
Extras: Total tool kit, plugs, instructions, spares list and sheet of safe usage.

CASTINGS

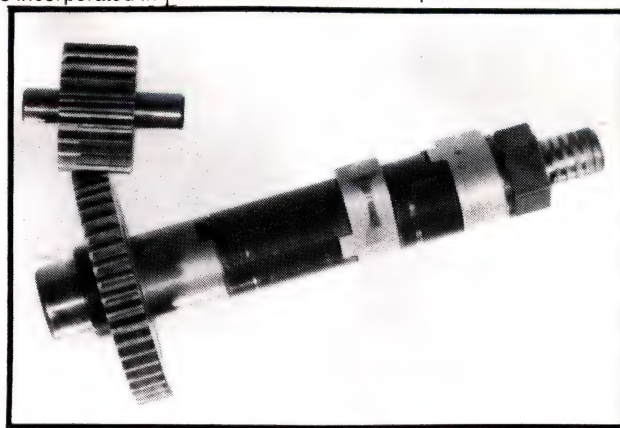
Nothing is so good that it can't be improved. You could not complain about the quality of Saito casting work on any of the range of engines; always of good, consistent quality. Somebody has pulled a rabbit out of the hat for a new surprise, as the castings on this engine are so much better again. The complexity and quality of the work has to be seen to be believed. All details are fine and sharp, and the mirror finish of the machined sections is a nice contrast to the silver sheen of the rest of the casting. The crankcase is of 3 parts, being the front main case, secondary rear section and rear case. All sections match perfectly, to blend as one unit when assembled. There are 6 ballrace bearings in the crankcase and 2 on the idler gear, for a total of 8, which is about the highest number of ballraces I have come across in one engine. Four of the bearings are for the crankshaft, which goes a long way towards the smooth running encountered, as this will ensure long life to the moving components connected to the shaft. There are some very nice design features incorporated in

the main case to add strength without weight and eliminate possible weak areas. A lot of thought went into the design before the first load of metal was poured.

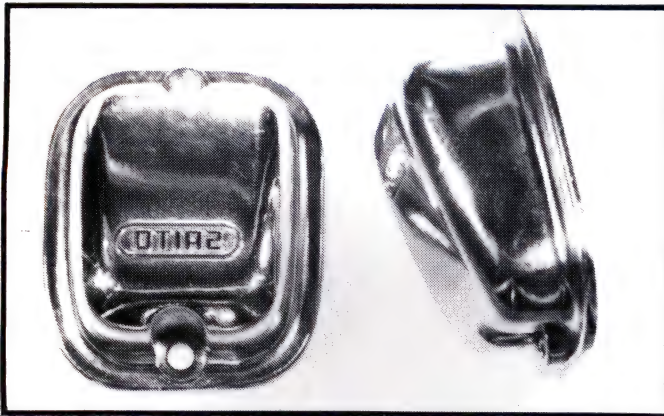
As is the usual practice of Saito, the head and barrel is one piece. As I have said before, there is a lot of merit in this design feature. The unit is lighter than a separate head and barrel assembly, no chance of warping or leaking, neater, lower in height and no threads to strip. Talking of stripped threads, the problem in this area with four-stroke engines is stripping the glow plug thread or the thread for the rocker box securing screws. A good two-stroke engine has a brass insert for the plug to allow many removals and replacements without the worry of little spirals of aluminium wire following a removed plug (stripped thread). Ladies and gentlemen, I present to you (a bit of a drumroll please) a first in four-strokes - a brass plug insert AND brass inserts for the rockerbox retaining screws. Remember, you saw it first in Saito! The brass plug insert appears to be a press-in fit and, if you look very closely, a couple of threads of a grub screw are visible down the front rockerbox retaining screw hole. This grub screw is a little added security to retain the plug insert in position. You will also notice that bronze inserts are fitted for the valve chambers and seats, and the internal shape and finish are factors of the high performance of the engine. The valves are thicker in section at the head to allow for a better angle seat. The change certainly paid off, as the valve seal is the best I have seen so far. In a static position it is generally possible to blow air (by mouth) through the valve seat seal in a model 4-stroke engine. The total seal is achieved at maximum compression and combustion when the engine is running. On the test engine I could neither blow nor suck air past the valves when



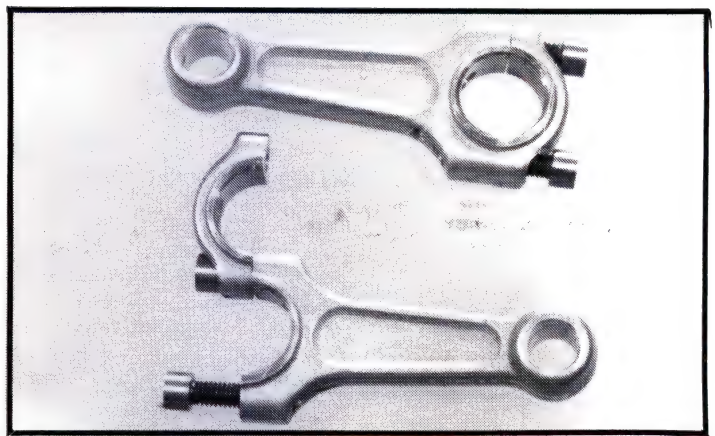
The Saito boxer twin.



Camshaft assembly and idler gear. The cam gear is a remachined unit from the single engine design.



Cast aluminium rocker covers are chrome plated for spit polished finish.



With no size comparison, these conrods could be from a Detroit diesel. Again, sturdiness is a side benefit from engine type.

closed, and that indicates an excellent seal in the static position. That seal could only improve with the engine running, and this is another performance factor.

The rocker gear is on a shaft secured in a cast-in pillar with a grub screw, and the rockers are sintered metal. (Simply, sintered metal is made of a metal powder pressed under tremendous pressure to its finished shape. The finish of the final job is extra fine, the metal is hard and tough, and complex shapes are possible without loss of strength.) Rocker adjustment is by ring spanner and Allen key, and the check is made with a feeler gauge. All the tools for this job are supplied with the engine. After considerable running, oil generally migrates into the rocker assembly, but I still like to add a bit whenever I check the tappets, particularly when the engine is new. The top end of the cylinders are superbly finished with the cast aluminium, chrome plated rocker covers. With the Saito name embossed on them, they add to the class of the engine. Definitely should not be cowed in - designed to be seen for gloating purposes.

RECIPROCATING BITS

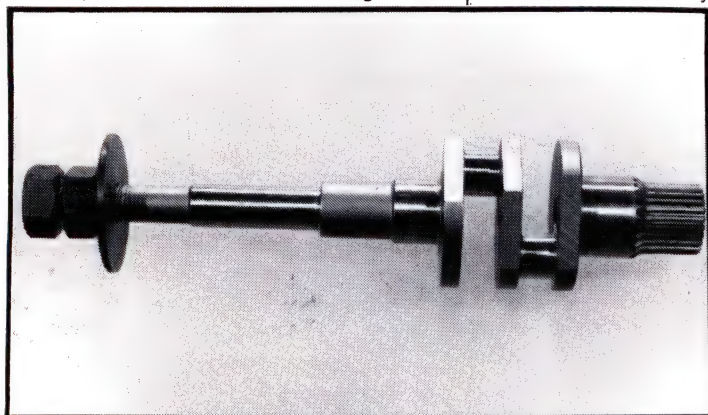
The pistons are cast, slipper design, and quite solid for their size. The wall thickness is 2 mm, which is quite sturdy. Being a twin, balance is not the problem it is with a single, and the added bonus of being a horizontal twin is that the weight of the piston does not have to be pushed vertically. It could be considered, remembering inertia and similar natural phenomena, that a slightly heavier piston would be an advantage. Once

acted upon by inertia, or perhaps kinetic energy, its inertia would then assist in pulling the crankshaft around. (Thinks... Hmm. If that's the case, maybe lead pistons would be even better; or gold-plated platinum? Maybe not.) One ring is fitted to each piston and this runs in the chrome plated brass bore of the liner insert in the barrel. The conrods are delightful little cuties. They are cast from high tensile aluminium alloy with split big ends, and look like miniature rods from a full size multi engine. The little end is 5 mm bore and the big end is 8.5 mm, which is very large for an engine of this capacity (5 cc per side). Larger bearings last longer, as the bearing surface is so much greater. The caps (bottom parts of the rods) are secured to the main body with 2.5 mm cap head bolts with the head diameters reduced. There are three 2 mm holes in the big end and one in the little end for the introduction of oil, so I wouldn't expect oil starvation in this area. Overall, the rods are well made, sturdy units and quite large for 5 cc, but this is, again, a benefit of a horizontal engine.

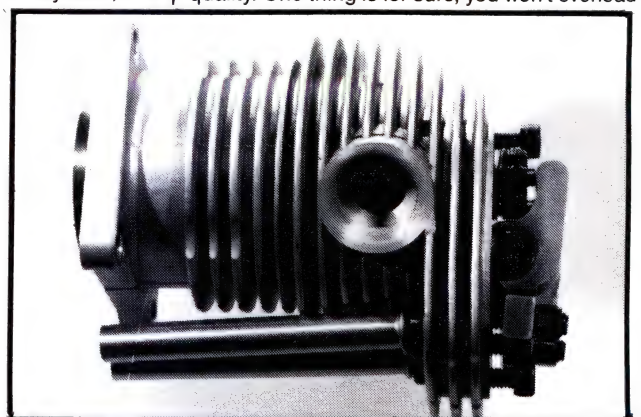
CRANKSHAFT

Now there's a nice bit of engineering. I don't know how active Gen Saito is in the factory these days (I see a lot of photos of him flying models enjoying the fruits of his labours), but he would have set the standard for certain practices in design and manufacturing. One of the design factors worth a second look is the crankshaft of the engines produced. They are machined from solid stock chrome molybdenum alloy steel, and

finished to a high degree of accuracy and surface finish. The size tolerance on shafts that fit into ballraces is very important. Too tight and the bearing is overloaded when running and hot; too loose and you stand a chance of the inner ring running on the shaft. Looseness also contributes to rapid wear of other components and engine vibration. On many engines I have had for repair over the years, I have found varying degrees of bearing fit and have had to rectify the problem either by removing a couple of tenths (tenths of a thousandth of an inch) from the shaft or by using a bearing lock resin to secure the bearing. I have yet to see a Saito engine with either of the mentioned problems. All that I have stripped down so far, either for review purposes or for crash repair, have had the preferred firm, push-on fit of bearing on shaft. The general design produces a very robust shaft with long wearing life and durability. The first multi cylinder Saito engine shaft with which I had dealings was in a crash damaged 270. The engine was very badly damaged and required a lot of rebuilding. The shaft took the first shock of the impact, which caused a slight bend in the front section. On checking with a dial test indicator (like a wrist watch graduated in thousandths of an inch with a plunger out the side that turns the needle when depressed), the throws and webs had not moved a fraction. When I reviewed the 300TD-TP I really enjoyed the quality of the shaft in that engine. The good news is that nothing has changed; the shaft in this engine carries on the tradition of quality. One thing is for sure, you won't overload



Very nice machining on the crankshaft. Crankpins are huge for an engine of this size, and can be utilised due to the engine type, where reciprocating weight is not such an important factor.



One of the cylinders showing slightly different shape from previous Saito engines, different manifold positions, single rocker shaft and new shape rockers.

these bearings. Not only are they fitted spot on, but there are four of them on the shaft and that is a lot of support. The front section of the shaft is extended to carry the prop driver, which is in the form of a bobbin 18 mm long. I wondered about this for a while until I had one finger tangle with the prop from behind to give me the worst prop injury I have ever had. The layout of the engine - horizontal twin - gives you a false image of space. No upright cylinder gives the impression that there is a lot of room before you reach the prop. The bobbin does, in fact, give about the same clearance as you generally find on an engine of this size, but a little twin engine is something new, and you need to be that much more careful. I consider that it was mostly my fault. Saito provides adequate safety and instruction, but the odds are less in my favour considering the number of engines I start, and all by hand. I was taking the opportunity to test some new plug-on nicad glow drivers, and one of them stuck. As I was wrestling with it to remove it from the plug, it suddenly canted, and into the prop I went. I lost one finger nail and all the flesh from the top of the finger between the first and second joints. The engine never faltered with the extra load. I stopped the engine, quickly checked that no blood was on the metal (causes stains) then staggered off to enjoy the shock that was coming over me. As I said, the bobbin gives you a good clearance, but still take care and use the wiring harness supplied with the engine for the plugs. (The scar is magnificent; so prominent that everybody sees it.)

THE LUMPY BITS

The rear end of the crankshaft has gear teeth cut on it and these engage an idler gear. (Idler gear is to make up the distance between the two major gears. This is its only function, and the number of teeth does not change the gear ratio.) The idler gear runs on two 8 x 4 mm ballraces. The camshaft is a composite of a gear, spacer, cam, spacer, cam, all geared together on a shaft and locked in position by press fits and a locknut. The shaft is supported by two ballraces. Cams play a big part in the performance of an engine and these are visibly high performance cams. The lift section is smooth and easy, and the peaks are very broad, giving considerable dwell. The dwell determines the length of time the valves are open for intake of fuel and outlet of exhaust, and the more you can achieve, within reason, the better the performance of the engine.

FUEL IN

The carburettor assembly consists of the main carb block attached to the engine with two bolts, the rotary barrel, high and low speed needles, induction tubes and choke unit. All machining is in line with the quality of the rest of the engine, and points to note are the fine thread for the main needle, tiny O ring in the threaded section to seal on the needle and the unique choke unit. Imagine the letter T, side-on, bent in the shape of a question mark, with the aluminium button rivetted to the bottom of the leg. The cross bar of the T has two holes that secure it to the engine with two of the case bolts. A cranked rod is fitted through the engine mount and, when this rod is turned by the knob on the end, the crank flexes the spring steel choke over the end of the carb intake, which is fitted with a rubber tube. The aluminium button is radiused and makes the seal for choking purposes. Uniquely simple and effective! The big plus for the carburettor is that it is mounted on the rear of the engine, out of the way and protected from dirt-digging landings.

BITS LEFT OVER

All that's left in the tin is the engine mount, which is formed steel and sturdy, but not so much so that it would damage the engine case in a hard crash, and the exhaust pipe unit. This latter piece of equipment is a neat unit of two lengths of 6 mm tubing protruding 155 mm down from the cylinders. They are joined to form a letter Y section, but I'm not really happy with one factor. The tubes point straight down behind the prop nut and would surely suffer damage in anything but a perfect landing. It will be a simple matter to bend the tubes back out of danger, and I would not be at all surprised if Saito produces a Mark 2 exhaust pipe.

HOW IT PERFORMED

For reasons mentioned above, the engine was run-in one day and the prop tests were done the following day, using an electric starter. (Yes ... I do have one; a bit grotty, old and rusty from lack of use.)

On the first day I ran straight 4:1 fuel in the engine, considering what might be inside as far as bearings are concerned. The first flick had the engine start backwards for a moment (slightly flooded), but the next flick had it away and running for the run-in procedure. Even during this period, and considering the fuel used, there were only 3 occasions where one cylinder dropped

out. A touch with the power source fixed the problem and, after the third instance it didn't happen again for the entire test period and several demonstration runs for visiting modellers.

The test running was done using Magnum standard 4-stroke fuel, which is 10% synthetic oil, 5% castor, 5% nitro and the rest methanol. With this fuel the engine gave out a consistent stream of thin, white smoke, which is good to see, and a steady dribble of oil from the breather nipple. I always like to see these signs, as it indicates that the oil is getting right through the engine and not burning during combustion. The engine has a 'cammy' sound at idle, which will be appreciated by engine enthusiasts who know this music, and the throttle response, coupled with the buzz type exhaust note, was reminiscent of speedway cars tuning up in the pits before a race. I found the response to throttle advance rather startling, as it was better than some 2-strokes I have tested.

Starting was one or two flicks, hot or cold, in first tests, then instantaneous with the starter. Subsequent running (finger healing) were done by hand, and again it was first or second flick, and no tendency to kick back. I used a considerable range of props for the tests, as I can see this engine being used in a broad variety of applications.

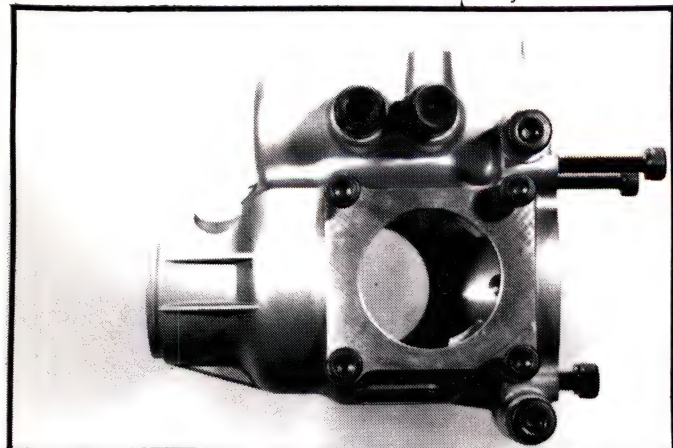
12 x 6 APC	(2,250 idle)	9,750 rpm
9.5 x 6.5 Bolly	4-blade	10,250 rpm
11 1/4 x 8 Bolly		9,500 rpm
11 x 7 1/2 Bolly	3-blade	9,000 rpm
12 x 8 Bolly		8,000 rpm
13 x 6+1 MK		7,500 rpm

THE LAST WORD

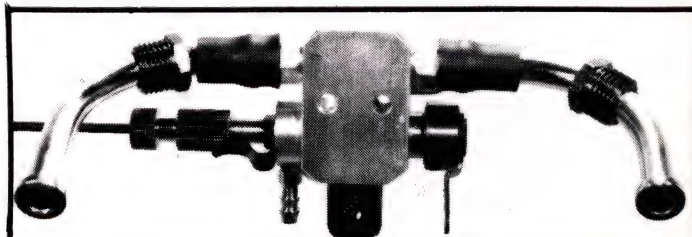
Well, a lot of modellers have been seeking a twin cylinder four-stroke engine for some time now, but one that does not need half a forest of balsa trees to build a model. Gen Saito has set a standard that will be hard to match, let alone better, if any of the other manufacturers care to pick up the gauntlet. Not only does the engine behave and perform excellently, but it is designed for long life and has an aesthetic appeal for any person with an appreciation of miniature four-stroke engines.

You are not going to find the engines in the discount tray at model shops, and you will probably hear comments about a high price. In this world, particularly in current times, you get what you pay for, and I am reminded of an old homily "Quality is like buying oats. If you want nice, clean oats, you must pay a fair price. However, if you can be satisfied with oats that have already been through the horse that comes a little cheaper!" A delightful piece of fine machinery for a fair price.

Engine for test came from the factory via Hobby Headquarters at 14/10 Yalgard Road, Kirrawee, 2232, and yours is waiting for you there or at any hobby shop where quality products are sold.



The part that holds it all together. The base section is the camshaft housing, and ahead of it is a blind protrusion that might have been intended for a breather nipple. Perhaps a change of design, as a nipple here could rob the rear gearcase of sufficient lubrication.



A pair of horns from a robotic bull? No, the intake manifold and carburettor assembly. Note the fine thread for the main needle.

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10 x 3.0 x 76 x 914	20 x 3.0 x 76 x 914	10 x 3.0 x 102 x 914	20 x 3.0 x 102 x 914	15 x 3.0 x 100 x 1200
6 x 6.0 x 76 x 914	12 x 6.0 x 76 x 914	6 x 6.0 x 102 x 914	12 x 6.0 x 102 x 914	6 x 6.0 x 100 x 1200
2 x 10.0 x 76 x 914	4 x 10.0 x 76 x 914	2 x 10.0 x 102 x 914	4 x 10.0 x 102 x 914	2 x 10.0 x 100 x 1200
1 x 12.0 x 76 x 914	2 x 12.0 x 76 x 914	1 x 12.0 x 102 x 914	2 x 12.0 x 102 x 914	1 x 12.0 x 100 x 1200

AGENT
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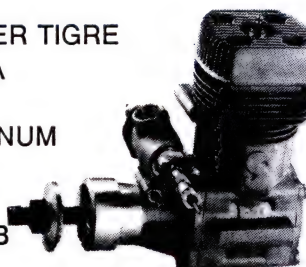


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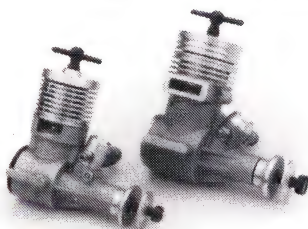
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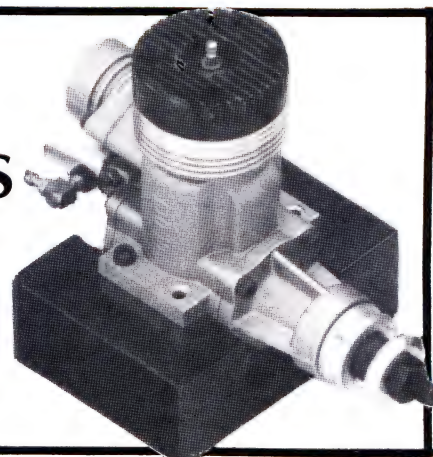
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Das Middle Stik: 1140 mm; shoulder wing; trike; for .25 to .30 engine and 4 channel radio.....	\$12.00
Das Mini Stik: 920 mm; shoulder wing; trike; for .15 to .20 engine and 4 channel radio.....	\$8.00
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Divider Mk 2: 1060 mm; low wing; TD; .19 to .25 engine; 4 ch.....	\$8.00
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Mite: 940 mm; low wing; TD; 2 x .15 to .19 engines, 4 ch.....	\$10.00
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Partenavia Victor P68: 2000 mm; high wing; trike; 2 x .19 engines, 4 or 5 ch; slow flying; optional flaps.....	\$25.00

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RG 5: 1520 mm; shoulder wing; TD; .35 engine; 4 ch; symmetrical wing section; upright engine.....	\$24.00
Roulet II: 1370 mm; parasol wing; TD; .19 to .40 engine; 3 ch;.....	\$11.00
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Alpavia: Fournier scale; 1625 mm; low wing; TD;	
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Bravo: 1470 mm; high wing; .09 or .15 diesel engine; 2 ch;	
multi purpose trainer and slope soarer; ailerons and elevator	\$10.00
Quanger: by Merv Buckmaster. 2400 mm span;	
for .15 to .40 engine and 3 channel radio	\$16.00
1/2A Quanger: by Merv Buckmaster. 1828 mm; span;	
for engine up to 1 cc; 2 channels	\$13.00
Sky Shark: by Bob Moye. 2000 mm span; 1.5 cc engine; 2 channels	\$10.00
Tarqueen: by Merv Buckmaster. 2310 mm span	
for .09 to .25 engine and 2 or 3 channel radio	\$11.00

ELECTRIC POWERED GLIDERS

Glydalec: by Terry Seabrook. 1800 mm; 2 different wing designs	\$13.00
Heron: by Bill Winter. 1640 mm	\$10.00
Urchin: by Wayne Hadkins. For 6 or 7 cells and .05 motor	\$9.00
Whisper: by Vin Masters. 2100 metre span; for 2 channel radio	\$13.00
Whisper 3: 1778 mm; for 7 cells	\$12.00

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Aircraft Floats: For aircraft up to 2 kg	\$6.00
Aircraft Floats: For aircraft up to 3 kg; 915 mm long	\$8.00

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Bearcat/Zero: Profile fuselage; 735 mm span; for .15 engine	\$8.00
Bunyip: 1/2A Speed model by Ivars Dislers	\$5.00
De Bolt Biplane: 700 mm span; for .61 engine	\$11.00
Demon: Combat; 890 mm span; for .29 engine	\$8.00
Firecracker: by Brian Eather. Super stunter; 1500 mm span; .49 engine	\$17.00
Fokker Dr1: Tri-plane stunter; 800 mm span; for .19 to .25 engine	\$8.00
Formula S: Stunter; 1420 mm span; for .35 to .40 engine	\$12.00
Mike Argander Special: 1/8 scale Mini Goodyear Racer; for .09 diesel	\$10.00
Mini Bandolero: Profile stunter, by Frank Coombs;	
for .15 engine; (2 sheets)	\$13.00
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Sam: Trainer by Esterco Barsic. 500 mm span; for .049 engine	\$9.00
Spud: by Maris Dislers. Combat; for .15 engine	\$11.00
Sundance: Stunter; 1370 mm span; for .35 engine	\$10.00
Tearalong: Combat; 890 mm span; for .15 engine	\$8.00
Tissue Trim: by Frank Coombs. Simple racer; for .09 to .29 engine	\$11.00
Trinity Trainer: by David Bevan. 600 mm span for .15 engine	\$7.00
U-Control Trainer: from Hobbies Illustrated 1948	\$8.00
Warhawk P40: Semi scale with flaps; 1420 mm; for .35 to .40 engine	\$10.00
Winder: Combat; 1065 mm span; for .19 engine	\$14.00

FROG SERIES

Frog Aerobat: CL stunter; for .15 engine	\$10.00
Frog Attacker: CL Stunter; 1270 mm span	\$11.00
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Frog Diana: FF glider; 915 mm span	\$9.00
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Frog Vixen: FF power; 940 mm span; .09 engine	\$8.00
Frog Witch: FF rubber; 915 mm span	\$8.00
Frog Witch II: FF rubber; 36 inch span	\$8.00
Frog Wren: FF glider; 635 mm span	\$6.50
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R.C. SCALE

Acro Star: 1270 mm; aerobatic biplane; TD; .40 engine; 4 ch;.....	\$21.00
Aeronca Champ: 1800 mm; high wing; TD; .40 engine; 4 ch; radio.....	\$13.00
Ansaldo SVA 5: 1300 mm; Biplane; TD; .40 engine; 4 channels; ailerons on upper wing only.....	\$10.00
Avro Avian: by Arthur Bugden & John Farmer. 1/4 scale; 2300 mm span; for 1.2 4-stroke engine; (2 sheets).....	\$30.00
BAC Superdrone: by Roy Dray. 1/4 scale; 3 metre span; for .40 4-stroke engine.....	\$22.00
Baby Ace: 1650 mm; parasol wing; TD; .40 to .45 engine; 4 ch; radio.....	\$20.00
Bebe Jodel D9: 1470 mm; low wing; TD; .29 to .40 engine; 4 ch;.....	\$12.00
Bristol Bullett: 1200 mm; Biplane; TD; .61 engine; 4 ch;.....	\$14.00
Chipmunk: 1730 mm; R.A.F. trainer; low wing; TD; fixed u.c.; for .45 to .61 engine; 4 functions.....	\$22.00
Citabria: 2600 mm; high wing; TD; Superb first big plane; for .61 geared engine or .90 Quadra and 4 channel radio.....	\$40.00
De H Moth Minor: Outlines & details only, drawn by Bill East. 1/6 scale; 1400 mm span.....	\$15.00
Dewoitine D510: Outlines & details only, drawn by Bill East. 1/8 scale; 1500 mm span.....	\$15.00
Druiue Turbulent: 1640 mm; 1/4 scale; low wing; TD; for .40 to .60 engine; good intro to scale.....	\$22.00
Druiue Turbulent: by Wayne Fitzgerald. 1/3 scale; for 1.2 two-stroke; (2 sheets).....	\$30.00
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<i>Cowl available from the designer</i>	
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Fleet Biplane: Semi-scale biplane; simple construction; 1249 mm; TD; for .40 engine and 4 channel radio.....	\$14.00
Flut-R-Bug: by Glynn Withey. 1/4 scale; 1930 mm span; for .40 2-stroke or 10 cc 4-stroke engine; (2 sheets).....	\$21.00
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Fly Baby: 1310 mm; low wing; TD; .10 to .15 engine; 4 channels; semi-scale fun model by G. Whitehead.....	\$10.00
Fokker D VII: 1510 mm; Biplane; TD; .49 to .60 engine; 4 ch;.....	\$26.00
FMA Pucara: by Hans Heck. 1/9 scale; 1600 mm span; for 2 x .25 engines; (2 sheets).....	\$21.00
FW 190: Semi-scale; 1300 mm span; TD; .40 engine; 4 channels.....	\$13.00
Gypsy Moth: 2280 mm; Biplane; TD; for .61 geared engine or .70 Quadra; 4 channels.....	\$26.00
Hawker Fury: 760 mm; Biplane; TD; .09 engine; single channel.....	\$10.00
Hawker Hurricane: 1270 mm; low wing; TD; .09 to .15 engine, Single channel, easily modified for 2 channels.....	\$12.00
Hawker Hurricane: 1730 mm; low wing; TD; .61 engine, 4 ch;.....	\$25.00
Laser 200: by Steve Bode. 2500 mm span; for 1.8 engine; (2 sheets).....	\$30.00
Lavochkin 5FN: by Pavel Bosak. Stand Off Scale WW2 fighter. 1120 mm span; for .35 engine and 4 channel radio.....	\$9.00
Lazy Ace: 1800 mm; Biplane; TD; .61 engine; 4 ch;.....	\$32.00
Messerschmitt 109E: 1550 mm; low wing; TD; .61 engine; 4 ch;.....	\$26.00
Morane 'N': 1420 mm; mid wing; TD; .29 to .40 engine; 3 channels; all flying tail.....	\$13.00
M.S. Epervier: Outlines & details only, drawn by Bill East. 1/6 scale; 1600 mm span.....	\$13.00
Mustang P 51: 1200 mm; low wing; TD; .09 to .25 engine; 3 or 4 ch;.....	\$22.00
Mustang P 51: 1600 mm; low wing; TD; .61 engine; 4 channels.....	\$22.00
Percival Gull: 1830 mm; low wing; TD; .61 engine; 4 ch;.....	\$26.00
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Pitts Special: 1320 mm; Biplane; TD; .61 engine; 4 ch; aerobatic; high performer.....	\$21.00
S.E. 5A: 1370 mm; Biplane; TD; lots of detail; .61 engine; 4 ch;.....	\$25.00
Spinks Acromaster: 1900 mm; TD; .61 geared or .90 Quadra; 4 ch;.....	\$26.00
Spitfire Mk IX: 1644 mm; low wing; TD; .61 engine; 4 ch;.....	\$26.00
Super Fili: 1530 mm; low wing; TD; .45 engine; 4 channel radio.....	\$20.00
Taylorcraft: 1830 mm; high wing; TD; American light plane; for .45 to .61 engine; 4 channels.....	\$28.00
Tiger Moth 40: 1270 mm; Biplane; TD; .40 engine; 4 channel radio.....	\$22.00
Tiger Moth 61: 1450 mm; Biplane; TD; .61 engine; 4 channel radio.....	\$25.00
Tony (Kawasaki Hien): WW2 fighter; low wing; TD; .60 size; 4 or 5 ch;.....	\$20.00
Volksplane: 1460 mm; low wing; TD; full flying tail; .45 engine; 4 ch;.....	\$12.00
Waco E: 1200 mm; Biplane; TD; .61 engine; 4 ch;.....	\$22.00
Westland Whirlwind: 1650 mm; low wing; TD; .30 to .40 engine; 4 ch.....	\$20.00

PYLON RACERS

Cassutt Special: QM; 949 mm; shoulder wing; TD; .15 engine; 2 to 4 channels;.....	\$8.00
Cobra: QM; 1070 mm; semi-scale; low wing; trike; .15 engine; 2 to 4 ch;.....	\$8.00
De Bolt Special (FAI): 1240 mm; low wing; TD; .40 engine; 2 to 4 ch;.....	\$12.00
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Little Gem: by Paul Lagan. Early QM design. Span 1 metre; for .15 engine; 2 to 4 channel radio.....	\$12.00
Little Mike: 1170 mm; shoulder wing; TD; .40 engine; 4 ch;.....	\$10.00
Little Toni: FAI; 1270 mm; low wing; TD; light weight; for .35 engine; 2 to 4 channel radio.....	\$12.00
Miss Cosmic Wind: QM; 890 mm; shoulder wing; TD; .15 engine; 2 to 4 channel radio.....	\$8.00
Miss Muffett: by Paul Lagan. Formula S; 1300 mm span; for .25 to .40 engine; 3 or 4 channel radio.....	\$12.00
Ole Tiger: ; 1/2A; 790 mm; mid wing; TD; .049 to .051 engine; 2 ch;.....	\$7.00
P. 51 Mustang: FAI; 1450 mm; low wing; TD; .40 engine; 2 to 4 ch;.....	\$16.00
Photon: by Danny Maslowicz. QM; 1200 mm; .15 engine; 2 to 4 ch;.....	\$12.00
Rivets: FAI; 1220 mm; low wing; TD; .40 engine; 4 ch;.....	\$13.00
Shoe String: QM; 1015 mm; shoulder wing; TD; 4 ch;.....	\$9.00
Teara: by Max Kroone. Formula S; 1200 mm; .40 engine; 3 ch;.....	\$14.00
3 in 1: Shoe String, Dick Ohm, Ole Tiger; QM; 1020 mm shoulder wing; TD; .19 engine; 2 to 4 channel radio.....	\$8.00

R.C. PATTERN

Atlas: 1660 mm; low wing; trike; .61 engine; 4 ch;.....	\$17.00
Curare 40: 1420 mm; low wing; trike; .40 engine; 4 or 5 ch;.....	\$14.00
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Dicky Bird: 1420 mm; low wing; trike; .60 engine; 4 ch;.....	\$17.00
Eagle: by Tom Prosser; 1900 mm; 10 cc gear drive or 1.2 4-stroke engine.....	\$20.00
Spectre: 1650 mm; low wing; trike; .61 engine; 5 ch; flaps.....	\$14.00
U.F.O.: 1650 mm; low wing; trike; .61 engine; 4 or 5 ch;.....	\$20.00

R.C. OLD TIMER & VINTAGE

Big A-Box: by Charles Barron, 1941. Enlarged to 84 inch (2130 mm) span; for .29 to .61 engine and 3 channel radio.....	\$16.00
Buzzard Bombshell: 1830 mm; high wing; TD; .29 to .49 engine and 3 channel radio.....	\$20.00
Debbie: by Nick Limber, 1939. 1900 mm span.....	\$14.00
Finneran Flyer: by Jack Finneran, 1935. 2300 mm span; for 40 4-stroke or 10 cc spark ignition engine.....	\$15.00
Frog Jackdaw: 1942. 1500 mm span.....	\$14.00
Fury: by Carl Hermes, 1950. 1600 mm span; for .15 to .40 engine (2 sheets).....	\$14.00
Krupp's 1937 Bowden Contest Winner: 2400 mm span; for .30 to .49 2-strokes or .49 to .61 4-strokes; (2 sheets).....	\$21.00
Long Cabin (1/2 Size): 1380 mm span.....	\$11.00
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Torpedo: by Les Adams, 1937. 2 metre span.....	\$14.00
Winter Special: by Bill Winter & Bill Kaluf. 1983 version of 1947 RC design; for .40 4-stroke engine; 5 controls.....	\$21.00

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PB2: by Thracy Petrides. 1200 mm span.....	\$11.00
Rambler: by Gilbert Shurman. 1200 mm span.....	\$11.00
Playboy Cabin: 1300 mm span.....	\$11.00

BOATS

Bathurst Class Corvette: by Cliff Beazley. 96:1 scale 590 mm; for .05 electric motor; simple plan.....	\$6.00
Day Cruiser: Cruiser; 915 mm; for .29 to .40 engine and 2 channel radio.....	\$8.00
Deanna: Cabin cruiser; 635 mm; for .25 engine and 2 channel radio.....	\$9.00
EZ-Vee: V-Hull Speed boat; 810 mm; for .29 to .40 engine and 2 channel radio.....	\$8.00
Hydraglide: Pontoon style airboat; by Tonci Vucak. for .40 engine.....	\$10.00
Miss Misty: Hydro; 600 mm; for .25 engine and 2 channel radio.....	\$8.00
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TRADE ENQUIRIES WELCOME

For Old Timer Sake

by Colin Borthwick,
52 Chapel Hill Rd.,
Chapel Hill,
Qld., 4069.

Deadlines seem to hang over my head like the sword of Damocles, suspended by a filament of carbon fibre and ready to fall at the slightest provocation. I must admit that over the Christmas-New Year period I put off the day of the typer until I have reached D Day, and then start to get my mind in gear to produce these words of wisdom! Coincidentally, there is another, much more significant, deadline expiring today, as I write this. This is the day that Shield turned to Storm in the Gulf. I express the earnest hope that the hostilities are concluded quickly, with as little loss of life as possible, and that the world will soon return to what we have come to accept as normalcy.

The workshop you know is better than the one you don't!

After eight years of trying to build itty-bitty aircraft in a single car garage belonging, I must admit, to my wife, I took the plunge at the beginning of December to have a new workshop constructed. I live in a three level house, the underneath of which, at the middle level, has never been developed. A consultation with Ian Garton, model builder and architect, soon showed that this space could be utilised as a rather long, thin workshop at 'minimum expense' by using a suspended floor and one existing wall. After six days of frantic sawing and hammering the new edifice was ready to accept light, power and a coat of paint. What I now have is a long, thin room, eight metres by two, which the Vintagers assure me will be very useful for high aspect ratio wings. There is 7½ metres of continuous bench, which was load tested in the traditional way. A few of us sat on it and measured the deflection, which was virtually nil. A good ship starts with a true bench. So far so good!

The next and certainly the most daunting phase of Operation Workshop was the moving of all the equipment, paraphernalia and odds and ends that make up everyone's building area. Eleven styrofoam boxes of bits and pieces were carried downstairs and dumped. I was then left to sort out boxes of engines and spare parts, radio equipment, chargers, machine tools etc. I am still only half way through this chore. I would advise anyone contemplating such a move to write the contents on the boxes or number them in such a way as to be able to differentiate between a lot of identical white styrofoam boxes. These are available for the asking, by the way, at your friendly fruiterer. He will even take them back when you are through with them. Thanks, Con!

I have tried to set the new Holy of Holies up in a logical fashion, dictated, naturally, by the inherent odd shape of the structure. I have kept the clean area at one end, and here I have placed all the equipment to service engines and radios. Servos do not like dust in the works, and engines positively abhor metal filings! The centre third of the bench, about 9 feet, is devoted to airframe construction, there being a deck outside for sanding, which should keep the dust to reasonable levels. I think that Merrilyn already has her eye on this deck for additions to her collection



Two thirds of the high aspect ratio workshop. This is before we moved all the gear in. Wish it still looked this neat. Borthwick photo.

of hanging baskets. Only time and lengthy battle will decide. The remaining one third of the area will be where the drill press, belt-disc sander and various Dremel tools will hold pride of place; in short, the dusty area. This is closest to the main door and is where the vacuum cleaner will be kept. The whole area is lockable and hopefully secure, as least from honest people. I do believe that a thief will gain access, no matter what. Time will tell.

This whole notion of a new workshop started when Merrilyn's car was damaged by hail, standing outside as it did, and was accelerated by the purchase of a new vehicle and the acquisition of an Adjust-a-Jig. Allow me to proffer a word of advice. If none of these contingencies pertain to you - stay in your present workshop and learn to enjoy its shortcomings. Most of them are in the mind anyway. Whatever you do - don't just sit there - build!!

BE HAPPY, HAVE FUN BE HAPPY, HAVE FUN

On a lot, dare I say majority, of OT plans is drawn the undercarriage. This is almost invariably not shown as true length and, as a con-

sequence, it can become difficult to know how long each piece of wire should be cut. Worry no more! Here are two ways of calculating the true length of wires required. This tip is courtesy of the SAM 51 (The Nifty One) newsletter from Sacramento, CA. Being the world's dumbest mathematician, I plump for the graphic method, but each to his won.

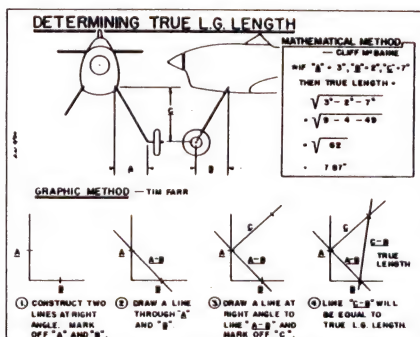
ENJOY ENJOY ENJOY ENJOY

Unfortunately, due to a promise to spend Christmas with Mother in Sydney, I could not attend the Nats this year. I have, however, heard all kinds of horror stories, mostly concerning the weather. Forty plus degrees one day and down to fourteen the next, with wind, rain and more wind. It is very disappointing to drive up to 5,000 km round trip to either sit and watch as other brave souls damage their airplanes or, even be braver and damage your own! What with fires, floods and an enormous range of weather conditions over this country during the Christmas-New Year period, perhaps South Australia might just have it right, utilising the Easter break. I don't want to be drawn into this discussion, but I believe we ought to have a serious think, at national level, about the timing of the Nats. After saying this, I do realise that Canowindra last Easter left a lot to be desired in the way of weather; wind, rain and mud being the order of the weekend. This is a tough choice! Congratulations to those brave souls who did brave the elements at Bendigo, and commiserations to those who, having braved the elements, took home little but plastic bags of bits. Remember, this is a FUN hobby, although even I will admit that under circumstances such as this it is a little difficult to keep this in mind.

MAINLY FUN MAINLY FUN MAINLY FUN

There has been some discussion of late about the use of hot racing engines in Duration. It seems that a light Playboy powered with a Series 20 McCoy, polished on the outside and chromed on the inside, is the way to go! I believe that I can speak with an almost total lack of bias, really, as I have in my collection McCoy's, Doolings and an Edco. With the exception of the Edco, flown several years ago in an overweight Super Zomby, I have preferred to stay with the 30 second engine run four stroke engines. By the way, can somebody enlighten me as to why some of the American 'engine experts' refer to these engines as 'four strokers'? Two strokes are 'two strokes' - not 'two strokers'. Odd, what?

I am hearing rumbles of a separate event for 'Racing Engines', to be flown some time in the future. My question is - why? Why do we need a totally different event for engines that rarely, if ever, powered free flight airplanes. McCoy's, Doolings and Edcos were used in Round the Pole Cars, that hobby where guys spend tremendous amounts of both time and money in order to make their creations invisible, and then went on to power U/C speed models, the intent of which was similar. One could say that these engines have no place in the OT movement as we now know it. Rarely, if ever, are they seen

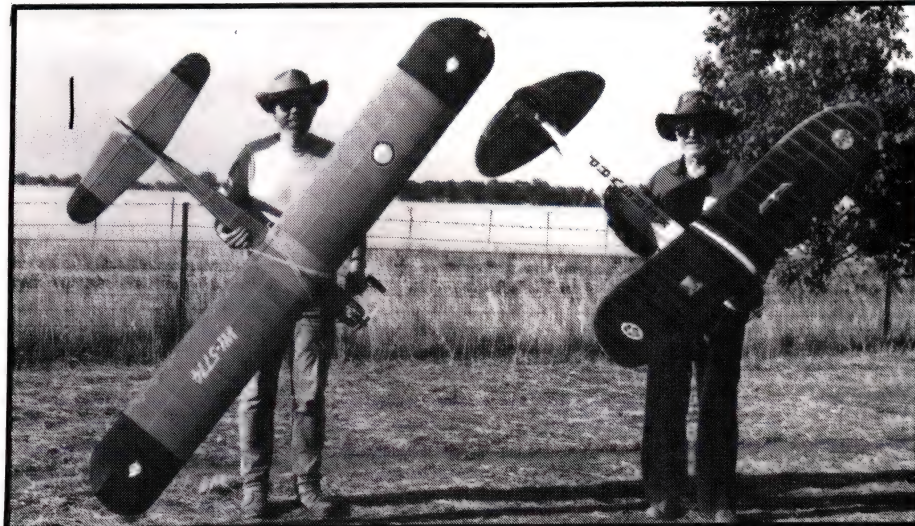


powering LER models in the US.

It seems to me, and a number of people with whom I have discussed the subject, that there is an easy answer to what could become a contentious issue. It is simply a matter of dropping the engine run times of 'racing engines' to something more equitable, and keep one Duration event. Instead of the current 35 seconds for these engines on glow, and a very generous 40 secs when on ignition, drop these times to 25 and 30 seconds, respectively. These notions will undoubtedly have the guys with Mc 60s etc for sale up in arms, but as I have said on several occasions, the competitive side of the hobby cannot be regulated by those guys with a lot of money or those who are competing on a shoestring. Rules must be set to encompass the majority of OT modellers, and I believe that this simple change of engine runs will achieve a "more even playing field", as the politicians are wont to say. Why don't we give it some thought? We have, over the last several years, developed an event in which one model-engine combination has dominated. It might just be time to "take a swab"! **REPLACE THE FUN REPLACE THE FUN**

In Airborne No. 103 I made a plea for feedback from you, particularly in regard to the OT Quiz. Allow me to thank you for saving me a lot of research, as not one reader (there is one out there, isn't there?) responded. I appreciate it, Guys! I did, however, get a few nice letters during the month. One from David Owen prompts me to give MECA a plug. For the uninitiated, MECA has nothing to do with the activities in the Gulf; but are the initials of the Model Engine Collectors Association. David is the Man here in Australia, and will be delighted (you will, won't you David?) to deal with your enquiries. David can be contacted at: PO Box 264, Fairy Meadow, NSW, 2519. I must agree with David's comments re the alarming trend in the subject matter of the photos from the SAM NA Champs in Chicopee, No, David. I only look like that when I am looking for a village that needs an idiot! Getting back to MECA. The 1991 fees are now due, US\$30.00, payable to Model Engine Collectors' Association c/o Bob McClelland, 3007 Travis Street, West Lake, LA 70669, USA. Tell Bob I sent you!

I also got nice letters from Gary Carey from



Out in the heat of Duration day: John Whittaker with his 86% Dallaire Sportster with tissue covering that helped to keep the weight down to 4½ lb. At right, Ted Hall with his Rossi 40 powered, double-sized Kerswap. Ted used tissue on the flying surfaces. Gerard Power took the photo.

Dalby, and Allan Laycock in Canberra. Out of the blue came an envelope from Evan Bengstrom of Gladstone, Qld., enclosing magazine plans of the, wait for it, Mickey Rooney Special. I have been looking for this one for a long time and was delighted with Evan's generosity. It was published in Mechanix Illustrated, November 1939, and is a pretty little high wing cabin model of 48 inch span. Write and let me know the designer's name and one other famous design from the same drawing board. This will renew my faith in you, the reader. Harold, you should know this one!

OLD TIMER AT THE BENDIGO NATIONALS from Trevor Boundy

These events were conducted by VOTA, the special interest group for OT in Victoria. The overall CD was Derry Brown (VOTA President), who was assisted by 5 contest directors whose reports follows.

Duration Wednesday CD - Peter Donovan

Flying started at 9.30 a.m. after sorting out ontestants and non-flyers into groups and group leaders. There were 17 flyers out of the 50 entrants. With the wind approaching 32 kph and

40°C heat, it was obvious that conditions were not good for flying.

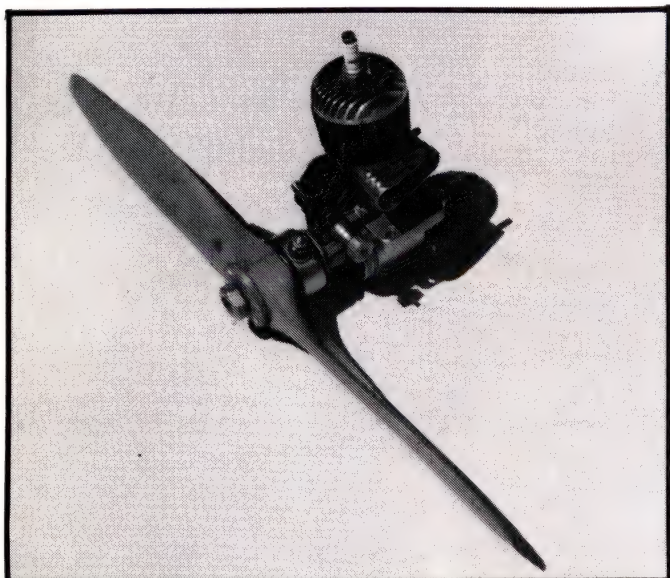
Five flyers made the fly-off: Ted Hall, Bruce Knight, Garry Turna, Graham Sinclair and Andy Kennedy. Andy's model caught a good thermal in the fly-off and he had a well deserved win. The other models in the fly-off did not appear to get any good lift.

Texaco and Junior Texaco; Thurs. & Sat.

CDs - Derry Brown & Kim Wareham

By the 8.00 a.m. briefing on Thursday it was obvious that the day would be hot and windy again. After a succession of postponements, with winds of up to 35 kph and 40°C heat, 12 flyers, out of a total of 57 entrants, posted first round scores. At 2.00 p.m. it was decided to abandon flying, and round one was ruled closed. The rest of the contest was to be flown prior to and after the Vintage Glider event on Saturday.

The weather on Saturday was cold and it was raining. At 7.00 a.m. the rain eased and round 2 was opened. Fifteen flights were made. The round closed at 8.00 a.m. to allow the scheduled Vintage Glider event to be flown.



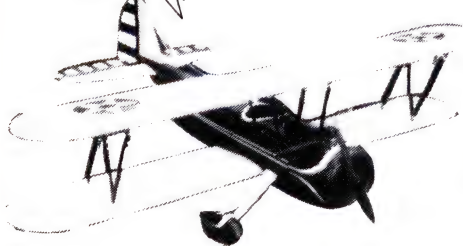
The Ohlsson & Rice 29 from Wayne Cain of Florida, offered as a Junior prize. How do you qualify as an OT junior?



At the Bendigo Nats, Doug Grinham's Super Skylark powered by a Frog 500. This is a 1949 design and is finished immaculately. French pic via Borthwick.

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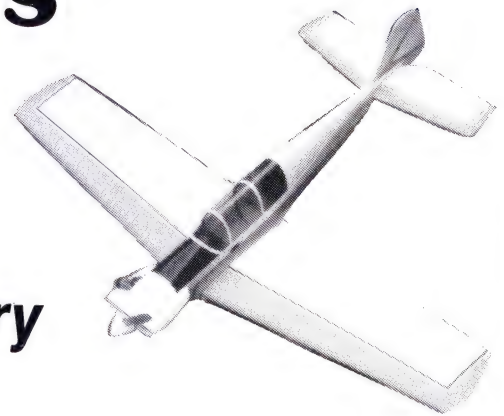
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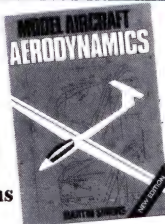
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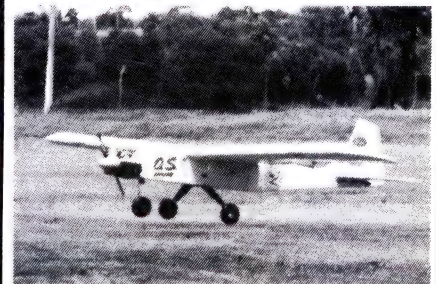
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Barry Thomas of the Bendigo Club with his Red Zephyr, checking the O.S. 40 four stroke. An excellent model to start with. Photo by Gerard Power.

By now a fly-off appeared to be unlikely, and it was suggested that a result be declared on the two rounds flown. However, being a National Championships, a ruling was made that the contestants must be provided with the opportunity to fly 5 rounds for a result. So at 1.00 p.m. rounds 3, 4 & 5 were declared open, and a finish time of 4.30 p.m. was set. With 7 flyers remaining, the prospect of a fly-off loomed. With two remaining flights, Steve Wiessner had to obtain max times and landing points in both to win. Missing the circle in both would mean a fly-off with Harold Stevenson for 2nd and 3rd. Missing one would mean a fly-off with John Quigley for first. He made the max and circle in both flights. The last flight was completed in high winds which blew up at the end of his flight. A much deserved win, Steve, and congratulations to Tod McGuffin for first place amongst the juniors, which was, incidentally, 6th place amongst the older kids.

½A Texaco and Junior ½A Texaco; Friday

CD - John Weston

Pleasant conditions after much heat and wind. Out of 23 entries, 17 contestants flew in what was a very enjoyable competition, and it proved again that all is not finished until the last flight is over. Steve Wiessner had 3 max rounds, and the only one who would force a fly-off was Merv Buck-

master whose aircraft was performing perfectly, but on his final round he suffered a motor cut (common for many) and Steve was smiling. Dale Wiessner and Tod McGuffin had a keen contest in the junior section, but birthday boy, Dale, earned himself a present of first place. Overall a good morning of flying.

2 cc; Saturday CD - Peter Hosking

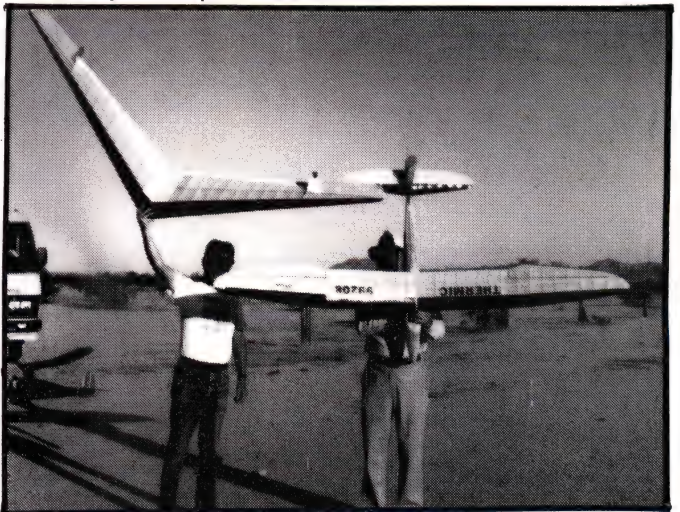
List CD, Warwick Bates, had to work, and yours truly filled in. Thanks Group Leaders, Basil Healy, Steve Wiessner, Graham Sinclair, Ted Hall and Harold Stevenson (also assisted in briefing). Derry Brown, thanks for your support in scoring this event.

The standard of flying was worthy of Nats level, and it was pleasing to see the SAM pre-amble adhered to by all pilots, and the high level of help and assistance to fellow aeromodelers. John Pond had the services of Monty Tyrrell, but nothing seemed to work as planned, forcing John to retire during the last round.

In round one, of 28 entries, 7 of the 20 flyers posted perfect scores, and we were guessing how many there would be in the fly-off. In round two the perfect scores were reduced to three, namely Harold Stevenson (only 70 next birthday), Graham Sheckelton and the ever reliable Steve Wiessner. In round three Graham Sheckelton



Brad Turner proudly displays his Tomboy at Cow Pat Field. Flies well - so does the Tomboy! French photo via Borthwick.



Taken in Texas, Eut Tileston, on the left, with his 100 inch Jasco Sailwing and Gerald Martin with his 100 inch Thermic. A couple of great Old Timers! The models aren't so bad, either! Photo Borthwick.

flew a max time but it seems that flat receiver batteries forced him to land out of bounds for a zero score. Rob Cornell, who had not maxed in the first two rounds, came home with wet sails to post a total score of 2458. Harold followed and was unlucky to finish with 2435 points. Last, but not least, was Steve Wiessner who needed a near perfect score to win. Steve did max, and with a total of 2520 points won the event.

Thanks to all, especially Mrs Joe McGuffin, for making this an excellent competition.

Vintage Glider

Saturday

CD - Peter Donovan

Saturday dawned cool and clear, but soon deteriorated into rain and wind. This event was postponed at 9.00 a.m. by general agreement among the pilots. At 11.00 a.m. flying was started in a lull between winds. Five rounds were flown as quickly as possible, as it was still raining. This event, too, was won by Steve Wiessner. Well done, Steve, in winning the first Vintage Glider event held in Victoria.

During the course of the OT events a computer program was successfully used to assist in:

1. Processing calculations; i.e. gm to SAM lb, and minimum motor sizes from wing area rules.
2. Performing routine additions for the rounds

3. Ranking large numbers of contestants for Tx channels and placings.

Thanks to Nats Chairman, Peter Harris, for a very well organised 44th Nationals.

Texaco

1.	S. Wiessner	Flamingo	OS 61 4S Ign	2480
2.	J. Quigley	Anderson Pylon	OS 61 4S	2460
3.	H. Stevenson	Nimbus	OS 61 4S Ign	2440

Duration

1. A. Kennedy	Playboy	McCoy 60	1280 + 719
2. B. Knight	Playboy	McCoy 60	1280 + 371
3. G. Turna	Yates Pylon	McCoy 60	1280 + 330

Vintage Glider

1. S. Wiessner	Thunderking 49	1368
2. B. Knight	Archangel 50	1057
3. B. Healy	Ghibli 43	1050

1/2 A Texaco

1. S. Wiessner	Playboy	1860
2. H. Stevenson	Playboy	1793
3. M. Buckmaster	Anderson Pylon	1741

2 cc

1. S. Wiessner	Gasbird	Webra Diesel	2520
2. R. Cornell	Dallaire	OS 10	2458
3. H. Stevenson	Gasbird	Enva CX11	2435



Paul Turner caught at the Bendigo Nats by John French. Model is, of course, the well known Peter Weaver design, Calamity Jane. As John says, the finish is perfect.

LET NOBODY TAKE OUR FUN AWAY

In No. 103 I published a list of coming events for OT ers for 1991. This encompassed Queensland, Sam 84, the Vintagents, and Victoria. Is there NO action in the other states? Remember, what you send is what you get! There is one small alteration to the Queensland calendar. Instead of the SAM OT Champs being held at RAAF Amberley on April 28th, they will be flown at the Lockyer Valley field at Glenore Grove. Coming from Brisbane, turn right at the Plainland Hotel and travel 7 km to the field on the left of the road. Coming from Dalby, do the opposite thing!

Come on you other States; get with it!!

COMPETE FOR FUN COMPETE FOR FUN

I have been pushing 1/2A Scale Texaco recently. How many models are now built? Mine is almost, except that I am finding it difficult to locate essentials in the high aspect ratio workshop. Here is a copy of an old Cleveland advertisement. All the scale models shown here are potential winners. Had a letter recently from Eut Tileston. Being the original thinker that he is he has built a Chester Jeep. Just as a back-up he also built a Piper Cub. Jim Adams, SAM NA President, has built a Hughes Racer. Plenty of variety here. There was a whole host of ultra light aeroplanes (that is what the English call airplanes), designed for motor cycle engines. Have a look at some of these. Whatever you do - do it! These could just be the FUN event of all time.

Les Parker, taking note of my recent comments re the Hollinger Nomad, ordered the plans from the Venerable Pond. As soon as we figure out how to build it, Les will have a go. He has taken over my late lamented Lanzo Record Breaker, now referred to as the Tree Breaker, and is rebuilding it. If, due to the new workshop, I am unable to finish a large Westerner, I may grovel a little and, hopefully, borrow the thing back for Canowindra. Hope you are reading this, Les! FUN FUN FUN FUN FUN FUN FUN FUN

Just received a letter from that noblest of modellers, George Aldrich. After a fifteen year hiatus, Aldrich Models has been re-activated. This is super news for the engine people. George has the skill and the equipment to do a terrific job of rebuilding and reworking all types of engines. The good news for us is that he is into OT engines, and has extended his original service to include engines such as O & R, Orwick, Anderson, and Super Cyke. Drop George a line at: 12822 Tarrytown, San Antonio, Tx, 78233, USA. The well heeled might prefer to

call him on (512) 656 2021. Check that it is daylight there, as good ole George needs his sleep!

While in the same vein, as one virus said to another, if you have a need for papers for OT engines, give Don Blackburn a try. Don, as well as running an engine cleaning and restoration service, has reproduction papers for engines ranging from Air-o-Diesel to Vivell. They will cost you US\$2.00 each. Contact Don at PO Box 15143 Amarillo, Tx, 79105, USA. He is on the phone at (806) 622 1657. Tell him I sent you and ask him to give Rosemary a hug for me!

Both George and Don are good guys and will not "have a lend of you". After all, they are Texans!

A parting word. Potter's Law of Concours Judging: "Beauty is only skin deep, but ugly goes clear to the bone".

And now the final word. Borthwick's Law of Cynicism: "Nobody really cares or understands what anyone else is doing". Sad, but usually true!!

Until Airborne No. 105, "Watch your six".

[illegible]

Pat Harrington with No. 1 helper, Ruth, at the SAM Champs at Chicopee. Pat got 3rd with the Cub in 1/2A Texaco Scale. Vehicle behind Pat and Ruth has a certain notoriety. Check with Pat. Borthwick photo.

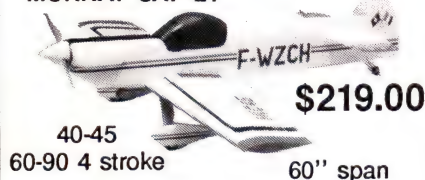
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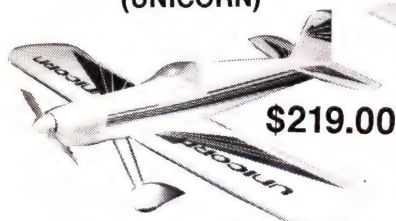


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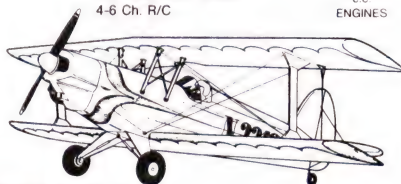
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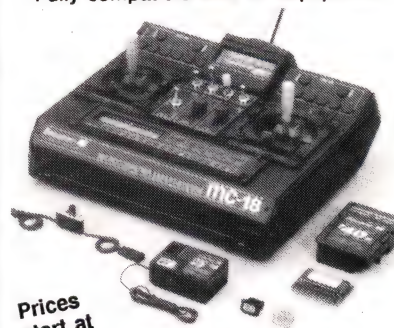
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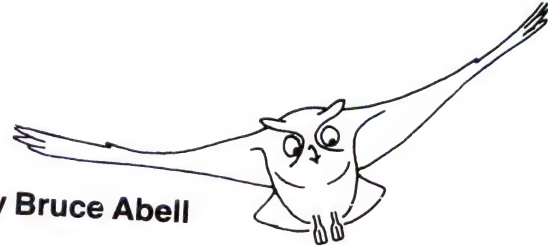
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ON SILENT WINGS

by Bruce Abell



CORRESPONDENCE

Among letters received recently was one from Glenn Smethurst of Churchill in Victoria, which included some questions about slope and cross-country models. I thought it would be worth repeating my answer in the column for other readers interested in these subjects. Some extracts from Glenn's letter will lead into the topic.

"I have been re-reading some of my recent *Airbornes*, and in issue No. 98 I noticed that Colin Felmingham suggested that Slopies should drop you a line telling you of our slopes. I am only just progressing beyond the beginner stage at the moment, starting with the Aries, then a Capella, which is the easier of the two to fly. The local club has two sites for official sloping, but the slope that has inspired this letter is in the hills near Morwell. A fellow sloper and I have found a knob, about 800 metres high, that caters for nearly all wind speeds and directions. The slope angle is 40 to 45 degrees. There are few trees on the western side, which suits our prevailing westerly winds. A small amount of effort is needed to get to it, but the hike out is tough.

The most amazing thing about the knob is its ability to convert thermal activity from the valley below into moderate slope soaring conditions on days of very low wind speed. On such days it is advisable not to stray too far out from the slope; 100 metres tends to be the limit. The second beauty of the knob is that it can be soared on a wide range of wind directions; northerly all the way round to southerly, although the southerly winds tend to be trickier to fly, and there is some thick bush below the south slope. The third beauty of the knob is its bird population: three or four wedge-tailed eagles, a good many hawks and other native birds. Such flyers help to establish where good lift is to be found and where the sink is, as well as providing some spirited flying competition!

I have two questions arising from my experiences so far.

1) What qualities make a top slope performer? And could you suggest suitable models?

2) I am interested in cross-country gliding and am unsure as to the glider qualities required for such work. Techniques of how to fly cross-country are difficult to come across. Could you describe a suitable glider type and some clues on how to get to the finish point?"

Hi Glenn, Thanks for the information on your slope soaring efforts. Let's hope it inspires a few others to drop me a note so that I can share their experiences with other modellers via *On Silent Wings*.

As to your first question, I have to say that every flyer has a different set of requirements, so a model that is a top slope soarer for one person is not necessarily suitable for other flyers. The individual flyer has to decide what he wants from his model and tailor the model to suit his own personal requirements. However, I can provide some guidelines to help you.

1. The Beginner and Novice Flyer. From what I've seen and experienced of slope soarers, the Aeroflyte kit of the Capella seems to fit this category

as well as any, and is a rugged aeroplane into the bargain. It's a nice, gentle yet responsive model on the slope in its standard form, yet can be quite lively if ballasted up. Probably the main requirements for the beginner and novice on the slope are for a model of around 1 to 1½ metres wingspan with a flat-bottomed aerofoil, of strong construction, easily repaired and reasonably simple to construct; i.e. of conventional balsa and pine not plastic or glassfibre, as the latter two types are more difficult to repair. Keep in mind that the average floater type of thermal glider (e.g. Aeroflyte Albatross) flies at around 25 kph, so these types will fly quite comfortably on the slope in light to moderate breezes, and can handle stronger winds if ballasted to increase the wing loading. However, the beginner or novice is better off with a smaller model because landing these on the slope is much easier than with the bigger ones.

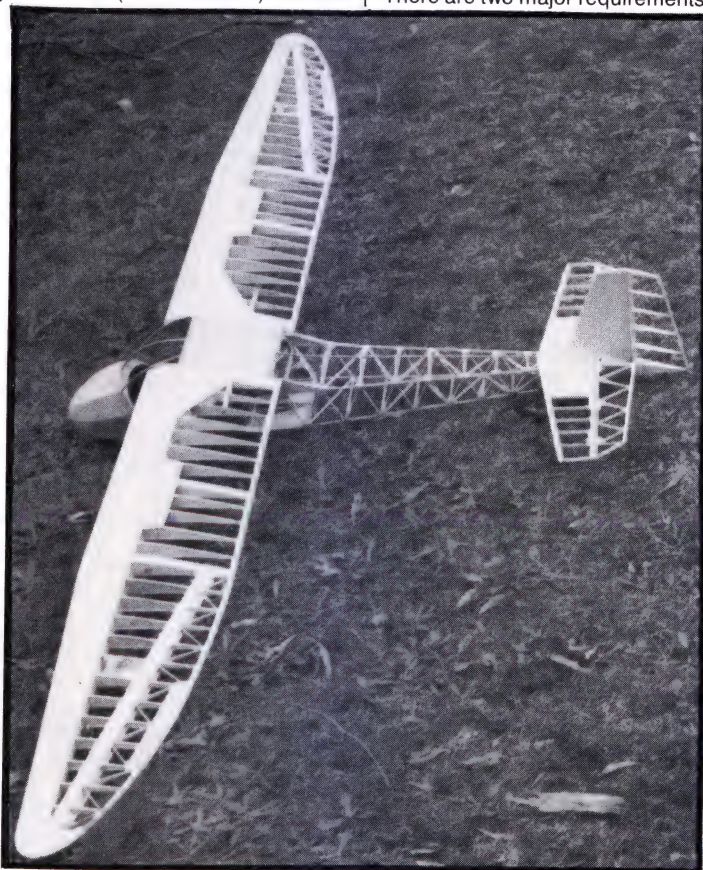
2. The Experienced Flyer. Here the requirements change, because this flyer wants a model that will handle the stronger winds (and subsequent stronger lift) of 30 to 50 kph, and is capable of some aerobatics. This often means that the model will be 1½ to 2 metres span and likely to have a symmetrical (zero camber!) aerofoil

section to give better inverted performance. Good examples of this type of model are the Funkey Skyfighter, Bob Martin's Talon and Southern Sailplanes' Slope Ricochet, although there are many other excellent kits that fit these criteria.

3. Scale Flyers. This is probably the most satisfying area of slope soaring, and the suitable types range from models of vintage gliders like the Grunau Baby or Minimoa to models of the high performance gliders like the Libelle or ASW.

However, a very fast growing area of interest among slope soarers is the building and flying of what is currently called PSS: Power Slope Soarers! These are scale models of powered aircraft, but without engines, and there seems to be no limit to what can be built and flown on the slope. I have seen photos of B29s, Lancasters, B52s, Phantoms, MIGs and even a video of a huge (over 4 metres span!) Northrop Flying Wing, all flying on the slope. There has been advertised in *Airborne* recently a 44 inch span scale ME163 Komet for slope soaring, which indicates the type of model that I'm referring to.

Cross Country Gliding. I did discuss this aspect of soaring briefly in a previous issue (See No. 98, page 53), but a further review won't go amiss. There are two major requirements for a glider to



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suit this category: (a) a wingspan of 4 metres or more; (b) good penetration.

(a) The large size is necessary to aid visibility, as the model is often a fair way away during a cross-country flight and, under these conditions, it is very easy to become disorientated, so a large model is a must.

(b) Good penetration is also a must for cross-country flying, as the model has to be able to fly through areas of sink quickly so as not to lose too much height before reaching the next thermal. A good low sink rate is also essential for the same reason.

Unfortunately, the demand for good cross-country models is not great enough to warrant production of suitable kits. The only one that comes to mind is the Sagitta XC, and I don't know whether it is still available. Most of the cross-country models are designed by the individual flyers to suit their own requirements, but the Southern Sailplanes kit of the Apollo (3.7 metres span) does come close to the above criteria.

Coming from free flight, my first interest in radio control flying was gliding, and slope soaring seemed to be attractive because there was no tedious rigmarole involved with launching. I have tried several gliders on the slope, mostly at Gap Hill near Sunbury. The first was the Hobby Hangar Astir, a GRP fuselage, foam wing, semi-scale model with T tail. It flew well in moderate winds but was fast enough to make landing difficult. The Honeyeater, a light 2 metre model, was too light for anything but thermals coming up the slope. The Halton Special, an ABS fuselage, foam wing design of about 2 metres span was good, but improved with some weight reduction. The Precedent Tiny, only five foot span but of conventional construction, was too small and much better suited to be a motor soarer. The Pilot Reicher 3300 was very good, being a ten foot span, conventional design with shallow polyhedral. I did not install the wing spoilers, which would have helped landing on the restricted area at the top of the slope. The Veron Vortex was better. Of the same materials as the Reicher, with plastic fuselage and built-up wings, it was smaller in span (100 inch) and a bit more responsive, but also limited by the lack of spoilers. I had several long flights with the Vortex, as it was quite steady, even hands-off.

My favourite slope soarer was the Dodgson Maestro, a twelve foot span, high aspect ratio model with full-span flaperons and spoilers. It was an armful to carry up the hill, and a back-pack almost full of Tx and support gear (extra clothing, food and drink) made it a minor expedition, but it was worth it. The Maestro would fly superbly in light airs with some flap droop or in strong winds with some negative flap. It could be slowed down to a hover for long periods, or dash upwind almost at will, and was dot high and motionless on many occasions. Landing was easy enough using no flap to keep the speed up during the approach, then slowing the model to a walk with flap almost over the spot, then preventing a fly-by with the opening of the spoilers. It was exhilarating: a two-hour flight seemed to be a lot shorter, unless the wind was cold!

The Maestro was not good in thermals due to adverse yaw from the flaperons and low spiral stability in tight turns. Also it was hampered, as were all the models mentioned above, by having a flat bottomed aerofoil that was thin by comparison with other contemporary designs. All of them would have been greatly improved with a modern aerofoil, less camber perhaps but with a bi-convex

front portion and a drooped trailing edge, like the Eppler 211, DAE 51 and SD 8040.

NOW ON VIDEO

In No. 102 I mentioned that videos covering various modelling construction techniques were available from the USA. Max Haysom of M & M Enterprises (17 Milpera Crescent, Wantirna, Vic., 3152) has had some of these videos converted (at considerable cost for the initial copies) for use in Australia. He is selling them for \$42.00 each, \$78.00 for two or \$115.00 for all three of the following:

1. How to Vacuum Bag Fibreglass Wings;
2. Cutting Foam Cores and Making Templates, including bonus plan for a simple automatic 'hands-off' foam cutter;
3. Making Fibreglass Moulds.

As Max has to pay royalties on these tapes, he is not making much of a profit, so he cannot afford to advertise. A good idea would be to purchase these as club property and hire them out to members. Max is also negotiating to market some more videos, so drop him a line with an SASE for up-to-date information.

CORRESPONDENCE

See photo of Maestro in Issue No. 103.

Glenn Smethurst wrote once again.

Dear Bruce,

Thank you for your speedy reply to my last letter. I am going to build the A-Tail sloper. In the plans an Eppler 205 is prescribed. I have also noticed that Southern Sailplanes uses this section a lot. I consulted my Bible by Martin Simons about the Eppler 205 section and found that its performance could be matched by the Selig 3021. Could you comment on the Selig 3021 and the Eppler 205 sections?

Another problem I have is how to plot such sections listed in Model Aircraft Aerodynamics. Perhaps it is that I haven't read the articles well enough, but I cannot seem to get a sensible plot.

Blue foam and brown paper seem to be gaining a following. Have you ever tried to cut a wing from blue foam? If so, were there any changes to your cutting techniques that might help me. I intend to make the A-Tail sloper wings from blue foam.

Yours faithfully,

Glenn Smethurst, Churchill, Vic.

Mike Combe's A-Tail Slope Soarer apparently has a bit of a weakness in the bend area of the A-Tail. I would recommend strengthening this area, as slope soaring can be pretty hard on models if the landing area is a bit rough. Perhaps covering the completed tail with polyester chiffon (doped on) would be the answer, as I have found this material to be very tough! It's readily available from dress material stores at around \$7.00 per metre.

As for the Eppler 205, I must confess that I prefer the Clark Y for all-round performance due to the latter's very forgiving nature, but for your purposes on a slope soarer it would be a little too slow. You could try it thinned down to around 10%, as Rod Wallace did (see Airborne No. 90).

I think that the Selig 3021 would be a better choice for your slope soarer than the E 205, as it appears to have a smoother performance curve over the whole speed range which would give better performance and handling over a wide speed range.

The E 205 is an excellent section. If better lift is what you want, the addition of a 0.02 inch thick turbulator at around 20% of the chord will give

you a noticeable improvement, but the drag penalty at the top end of the speed range could be too great for slope flying.

As for your problem in plotting sections, I don't know whether you are trying to plot manually or by computer. The manual plot is usually done from a table of ordinates that gives a series of stations (expressed as percentages of the chord) going from 0 to 100, with upper and lower ordinates for each station. The computer plot is usually expressed in a two column table where the left column is the chord station, commencing at the trailing edge, and the right one is the ordinate going over the top to the leading edge and then back around the bottom of the section to the trailing edge. These can be hand plotted but it is rather tedious.

Why not send \$10 to John Channon at Jordal Hobbies P/L, 397 Anzac Parade, Kingsford, NSW, 2032, and ask for his illustrated catalogue of wing sections? This lists, with outlines, a range of sections that are available plotted ACCURATELY on mylar film, at a reasonable cost, in whatever chord length you require.

If you have a friend who is into computers, perhaps you could task him or her into doing your plots for you if they have a suitable programme.

I have had no experience in cutting blue foam wing cores, but feel that it would not be a great deal different from cutting white foam, although probably a bit slower due to the higher density of the blue foam. However, if you can afford it I would recommend that you buy a good video on the subject from M & M Enterprises.

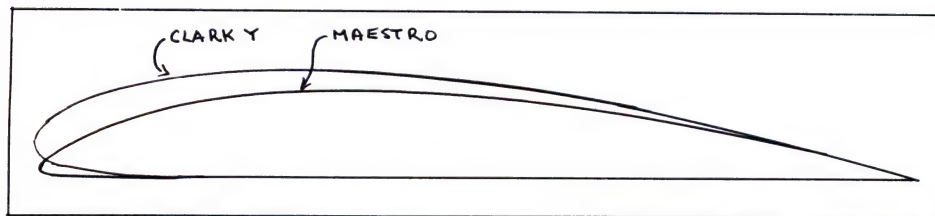
AS I WAS SAYING

(This is the Editor speaking.)

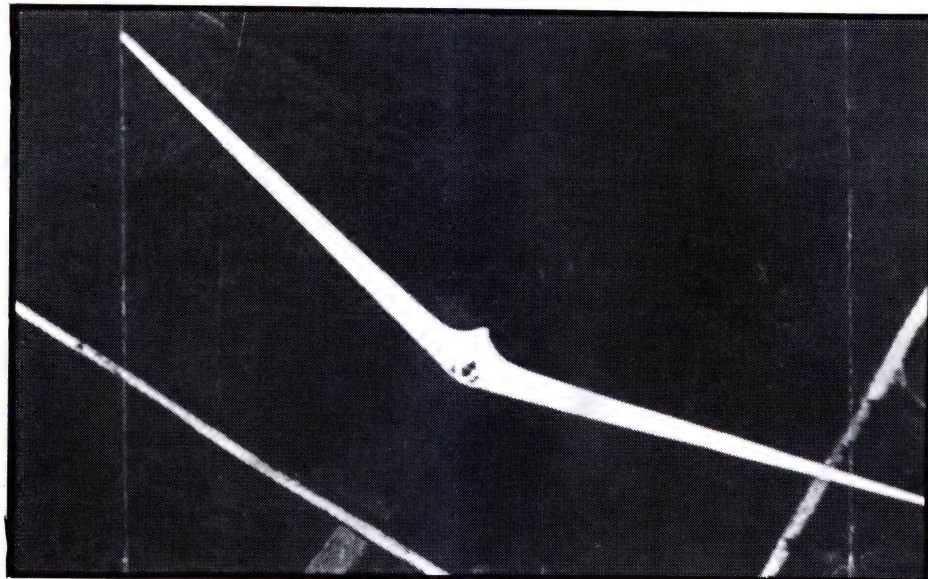
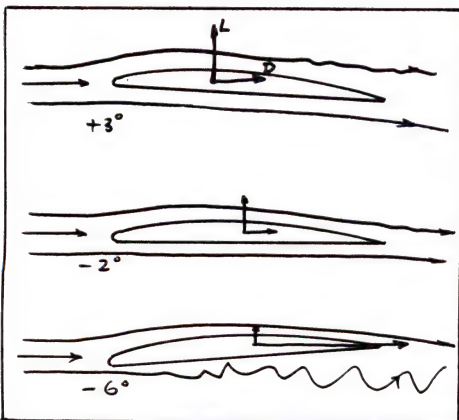
Although the Maestro was shown out of context in No. 103, having it mentioned leads on to the interesting phenomenon that could be observed quite often in those early years of RC glider development, and with many other models, kits and original designs, not only the Maestro. With a good pilot at the controls the Maestro could be slowed with a bit of positive flap, and soared in moderately sized turns. After drifting with the thermal it could then be brought back a considerable distance from downwind, when most other gliders would fail to reach the launch area.

However, if the nose of the aircraft was lowered to pick up speed for the return from downwind, just a little too far the aircraft would appear to dive off altitude at a disastrous rate and end up in a downwind paddock. I found this difficult to cope with! I also found that the same thing happened with other gliders of the same era, so I preferred soaring in almost no-wind conditions, which made hi-start launching tedious to distraction, and I resorted to using a small engine for launching.

Flying became very easy but the problem had not been solved. Gradually I became aware that the designs that had a glide ratio that decayed precipitously with too much speed all had flat bottomed aerofoils with a shallow camber entry angle; i.e. sharpened noses. The reduced-sized tracing from the Maestro plan shows a typical wing section compared with Clark Y.



I considered it possible that if the angle of attack was lowered only a few degrees the airflow remained the same but with reduced coefficients of lift and drag, and a consequent increase in flying speed. But if the angle of attack was reduced too far, the airflow separated on the bottom surface. The acceptably small wake from the upper-surface separation (possibly kept low by the low camber and rearward placement of the camber) had added to it a gross increase in drag, which robbed the aircraft of its speed, the bottom wake being fed by the energy gained from its altitude, so that the model just fell out of the sky. In current terminology these sharp-nosed, low camber aerofoils have a particularly narrow drag bucket. The second diagram illustrates the idea, but it does not prove it! A little supporting evidence is that the Maestro did not show its bad behaviour when it was made to fly faster by using ballast instead of by dropping the nose.



The Horten 6, a research tailless glider designed by Walter Horten about 1940. The wood and metal aircraft had an aspect ratio of 34:4.

HELLO! IS THAT REYNOLD'S NUMBER?

(Thanks, Model Builder!)

Responses to my comments about Re have pointed out that it varies with the size and speed of the model, a point which I made at the beginning of the discussion. I have also acknowledged that, for any one glider, the Re varies widely from thermalling, when it is very low, to the much higher values experienced in the F3B speed run.

And it is obvious that Re varies along a tapered wing, even at constant flying speed. However, it is a reasonable starting point in designing a glider to assume a value for the Re, whether for a floater or an F3B style of model, and look for an aerofoil that will give the kind of performance required. The aerofoil analyses in Soartech No. 8 give worthwhile information on this basis.

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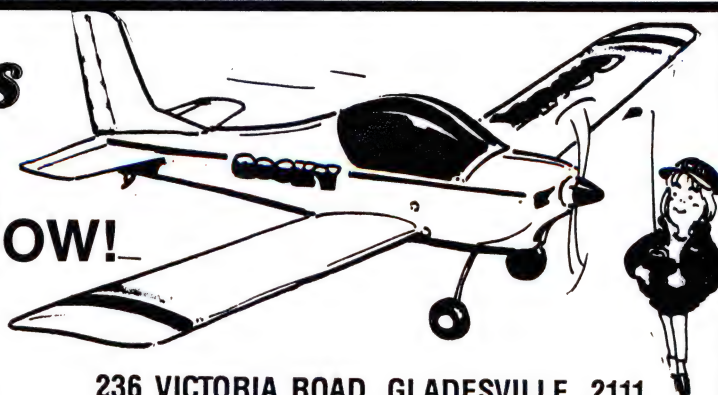
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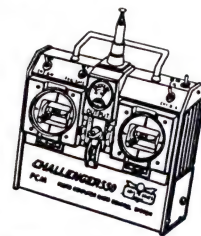
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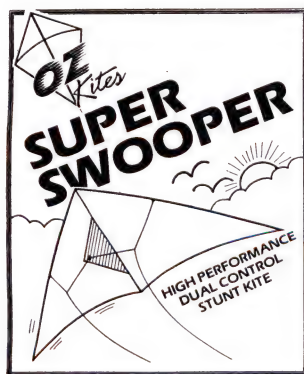
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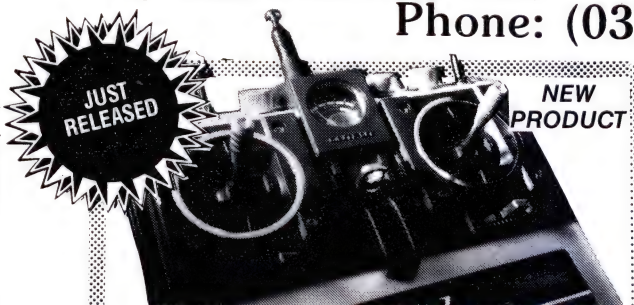
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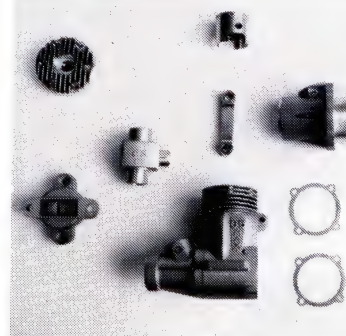
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by Ivars & Maris Dislers

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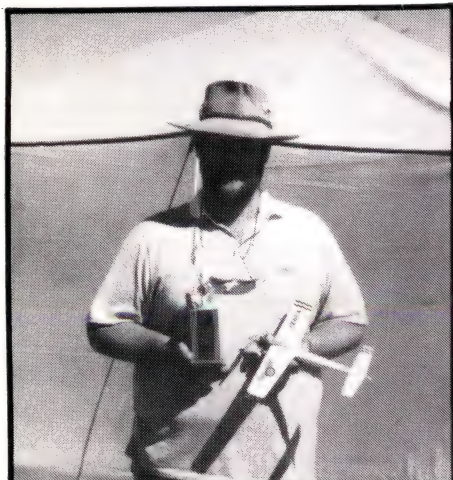
The National Championships held at Bendigo, Victoria, were the best supported in recent years. Maris was able to attend this event. His overview, as well as Leon Baird's report on FAI Aerobatics and my summary of FAI Speed appear this issue. More reports and photos will appear in No. 105. We congratulate Graeme Wilson and Brian Randall who ended up equal Nats Champ of Champs. Unfortunately the reports in this issue had to be written without the benefit of official results, which prevented inclusion of some scores.

THE BENDIGO NATS

by Maris Dislers

The MAAA National Championships, for those who have not been, are like a week-long extravaganza of all types of aeromodelling. Unlike many countries, Australia still holds all classes together rather than splitting them up over the year. To my mind the Nats are the best tonic available, even if you do not compete. It is great to be part of such a large bunch of nutters doing nothing but what they like best for a week. Furthermore, it is the one time of year when I have a look at what the guys flying other categories and classes do. After all, any aeromodelling is good, even if one's own preferences lead to specialisation.

This report merely recounts a few of the highlights as I saw them. The weather was hot, but fairly calm with lashings of sunshine. It was just as well that most people adopted sensible precautions against being sunburnt. A week in the sun can be a long time. Constant rain on the last day was a marked change. Performances were on average only marginally down due to the altitude, temperature and air pressure. Some were severely affected, while others were affected but found a prop, compression and needle combination that worked efficiently in the thin air.



Mick Gray from the Hunter Valley, with his Midge speedster that did 172 kph to the NSW no-pylon rules last November. Photo from Singleton MAC.

FAI Team Race

A number of teams capable of winning the day promised close competition. All used Nelson engines except for Ewart-Bradley's Cipolla. Most teams lacked fast pit stops, with pilots often

cutting the engine early, giving a long glide down for landing. As much as 8 seconds per race was wasted. The semifinals saw some exciting racing with the nine fastest teams giving their all to make the final. Three Victorian teams contested the final, setting a cracking pace in the first 100 laps. Disaster struck when Copestake-Ellins' lines were snagged during a pitstop by the wing-tip skid of Randall-Lumsden's model as it rolled in towards its own pit segment. The jury disqualified Randall-Lumsden, while Copestake-Ellins, unable to continue, took second place. Nugent-Nugent continued on to win.

Goodyear

This was the most popular racing class, with twenty teams entering. Plenty of variety in equipment, with Nelson, Rossi and OPS engines in use. Races were at times spectacular, with the fastest models, flying at almost 200 kph, mixing it with the slower craft of the novices. Slick pit-stops and good airspeed were needed to qualify for the final, with a number of teams missing out by only a few seconds. Randall-Lumsden's (Vic) Nelson blew a glo plug early in the final. Despite a clean run for the remainder of the race, they could not catch the two South Australian teams. Second placegetters, Peilschmidt-Pretty had no such trouble. Greg Pretty detuned their Tim Gillot prepared Rossi Mk 3 in the nose of their Mr D to ensure a trouble-free run. Despite superior airspeed, their long, slow landing approaches dissipated the advantage. Winners Fitzgerald-Fitzgerald showed all how it should be done, with a faultless race, their Nelson diesel powered Mr. D performing very sweetly.

Combined Speed

The overall entry of 18 made this the largest combined speed contest for some time. A new Class 1 (Open 2.5 cc) record of 262.8 kph was set by Ivars Dislers' Irvine powered model, improving on the previous record by 4%. Proxy

pilot on this occasion was Alan Barnes (NZ), and he looked to be enjoying himself. Fuel and general set-up were as used in FAI Speed - but, of course, the additional drag from the longer lines slowed it down. In second place was Robin Hiern with his Class 1 entry, which did 254.3 kph, or 100.08% of the previous record. Robin used a Rossi 15 Mk2 in a long wing, long fuselage sidewinder. Phil Wake took third with his .60 model but unfortunately crashed later on. In fourth place Noel Wake was best of the .40s with his purpose-built Class 4 monoliner, ahead of Kerry Ewart's entry. Fastest jet flyer was Gary Turna, around 281 kph. Hot weather and gusty winds made the task of flying fast difficult. I missed much of Combined Speed as I had to choose between Speed and Combat. Both contests were on at the same time but at different sites. Information used in this report came via a phone call to Robin Hiern.

FAI Combat

Very hot and gusty conditions. The Combat site itself was dry and dusty. Quite a number of bouts were won on air-time alone, but not all bouts were scrappy. The large crowd of spectators enjoyed watching some great combat as well. Brian Randall (Vic) and Graeme Wilson (Vic) were both on form and fought it out for the top spot.

FAI Aerobatics

by Leon Baird

The event was well supported, with 32 entries, over four rounds held on as many days. Dower Park oval, where activities took place, was in excellent condition and probably the best venue of all the flying sites at the Nats. The grass was smooth enough, if not perfect, and the area was sufficiently large to provide 4 marked circles. This allowed practice on 3 circles, which was most welcome. It was quite a sight to witness all 4 circles in use at the same time over the 4 rounds.



Display organised by the Aeromodellers of Logan City. Good public relations are important to our sport.



A rose with the thorns! Angela Burke, front, Brian Burke, left, and Ray Chapel, at the ALC field opening. Photo from Merv Cox.

Shade was provided by a grandstand and some large trees, and was most welcome.

Round 1 was held on Monday 31st Dec. during very hot conditions. Little wind, but what there was varied in its direction, which made flying difficult. The judges changed their position with the wind direction so that the contestants could perform their manoeuvres downwind. Often this meant a change several times during one flight, and was typical over all 4 rounds.

Colin Jeffrey was first up, using a new model which surprised a few people. The flying surfaces were quite conventional, but the fuselage seemed to be as deep as it was long! This did not seem to distract Colin, as he put in a good flight. Another notable feature of this model was the position of the leadout guides, which were not in the usual position at the tip, but halfway along the wing instead. At the wingtip was a long slot so that the lines could swing in any position while flying. According to Colin, this provides more tension and less yaw during manoeuvres. The contest director, Peter Rowland, flew early in the round, with a .35 powered Rookie, which had an unusual high-mounted wing. It flew very slowly, and Peter was not able to complete the schedule. Another notable flight was when Peter Harrison flew his new Magnum from a Sig kit. Unfortunately it had a warp in the wing and lost tension badly in outside manoeuvres. People watching had their hearts in their mouths throughout, but Peter was able to bring it down to earth in one piece. [Built straight, the Magnum is a very competitive model and very popular in the USA. I.D.] Just before lunch Peter Rowland Jnr. prepared his model for flight. As soon as it had started the propeller flew off and the motor did a shaft run. In the following panic to stop the engine, Peter Rowland Snr. grabbed the fuselage and buried the nose in the ground, breaking the tailplane both sides in the process. An unfortunate incident. [Some propeller hubs tend to compress with time. Check that the prop is tight

before a day's flying. I.D.] At the conclusion of Round 1, Paul Turner was leading with 3391, Brian Eather was next with 3379 and Doug Grinham was third with 3193.5.

Weather conditions remained the same for Round 2 the following day. There was some shuffling of places as some people improved their scores, but at the time of submitting this report full details were not available. One model worth describing was the latest version of the Firecracker by Brian Eather. It featured an OS 40 VF with Hunt carbon fibre pipe and Supercool after-muffler, running a Brian Eather 12 x 3 three-bladed prop. This combination produced a high-revving but quiet engine run which was very smooth and even. The model was equally smooth, but Brian tells me that the engine-pipe set-up took a lot of work initially to get right. The overall result was very impressive.

Round 3, held on Thursday 3rd January, proved to be the worst, weather-wise, of all four rounds, with very hot 35 kph winds of variable direction. A vote was taken and it was decided to continue the round. Some elected not to fly, and those that did scored lower than in previous rounds. Even Paul Turner, who flew early in the round, had a lot of trouble with his model in the wind, and nearly lost it. The places in Round 3 were: Reg Towell 3222.5, P. Turner 3204 and J. Reeves 3066.

The weather for the last round on Friday was the best, with much cooler and calmer conditions. A great conclusion for this event. There was a struggle amongst the top flyers to improve their scores in the excellent conditions, and there was some shuffling of places. The eventual placings were Paul Turner first, Brian Eather second and Reg Towell third.

Overall, aerobatics and the Stunt Clinic on the preceding days, were a complete success. A big thank-you is extended to Art Adamson who added much colour and enthusiasm to activities, and to the other four judges, Bill Cecil, Dennis

Percival, Vic Mitchell and Steve Mitchell. The judges did a fine job in the hot conditions. We also thank Peter Rowland, the contest director, and Ian Ferris, who put a lot of effort and time into making the contest and clinic possible.

FAI Speed

A new record of 271 kph was achieved by Ivars Dislers' (SA) latest Irvine powered model. Model specifications: own design Ruski Mk1; 465 gr dry; 850 mm wing span; 500 mm fuselage (bass-wood); 195 mm tailplane span (balsa & spruce); removeable one-piece cowl; Bolly-Kerr SB prop (76 x 5.7). Engine: stock P/L timing, Irvine plug, shaft retimed to open 23 deg. ABDC and close 61 deg. ATDC from 27/60 stock timing as well as some gas flow work and thorough clean, particularly inside the shaft.

ROUND 1. Chris Trewern (Mk2 Rossi) was up first (proxy flown by R. Hiern) and recorded the first official time of 17.64, or 204 kph. Possibly the CS pipe was on the long side, as it had ample power at take-off but not much top end revs. Phil Wake (Mk3 Rossi) followed with a 224.5 kph flight that was starting to pick up in the last few laps. Kim Parkes cut in the dolly with poor ground power symptoms and called an attempt. Ivars Dislers (proxy flown by M. Dislers) flew next. Ivars had a loose prop problem which blew the plug, but at 264 kph it was a good effort. Noel Wake (Mk3 Rossi) followed but was too rich to pipe in the air, landed and went up again on a better setting. Robin Hiern used his Irvine for this round and with a crisp sounding run got a respectable time on the board of 14.37, or 250.5 kph. All eyes were on the next flyer, Alan Barnes from N.Z., who had done 13.58 at home. His AB 15 engine seemed to suffer most from the low density conditions or the P/L fit had gone off. Whatever the problem was, on his first attempt he could not coax sufficient power from the engine to take off, but at the end of the round got a flight in at 245 kph. Former Australian record holder, Graham Burgess, using a Mk2 Rossi in his older, fully-enclosed model, recorded a no time; not enough laps due to sudden fuel starvation on about the 6th lap. Kim Parkes managed to get airborne and was circulating at around 17/10 but was judged to be flying too high and thus the time was disallowed. Alan Barnes was still having trouble coaxing his AB 15 up to anything like its normal power, but at least scored a time in the round.

ROUND 2. Robin Hiern tried switching to his trusty Rossi Mk2 model, but recorded a no time due to some hassles with his handle safety strap. Ivars Dislers improved to about 268 kph - quick enough to lay claim to the Unlimited FAI record but not quick enough to claim the F2A contest category record. Graham Burgess scored another no time with the same fuel feed problem, and Alan Barnes made a slight improvement, but not enough to overtake Hiern and change the order of the top 3. Kim Parkes was circulating nicely at about 16.7/10 but ran out of fuel on lap 9 and scored a no time. Phil Wake appeared to be too rich, and Chris Trewern recorded another slow but consistent run.

ROUND 3. The highlight of the round was Ivars Dislers' model improving further and recording 271 kph. Good enough to claim the F2A contest category record. This was also a crunch round for some. Alan Barnes' engine cut before he had enough timed laps. Noel Wake and Kim Parkes managed to get a score on the board despite cooking up. After more vapour locking during his first attempt, Graham elected to use his Irvine

powered model, got a nice run going at around 248 kph and moved into 3rd place ahead of Alan Barnes. In the end it was a comfortable win by Ivars Dislers at 271 kph, with Robin Hiern second at 250.5 kph and Graham Burgess third, in difficult air.

NEWS FROM N.S.W.

Singleton MAC held a Slow Combat and Midge Speed day on 25th November.

SLOW COMBAT [2.5 cc profile fuselage type models. I.D.] had 12 flyers with 4 or 5 flyers being RC pylon racers. An extract from the SMAC newsletter reads "Free flight made a brief appearance when Mike Silke's SMAC 1 decided to seek greener pastures on its own. The pylon boys might have thought for one moment that they were at a pylon meet the way the SMAC 1 went (like a rocket). Peter Scott showed some amazing skills with his SMAC 1. I still don't know how it stayed out there. It seemed to defy the laws of gravity. Well done Peter. When the smoke cleared, Steve Rothwell was first, Justin Scott second and Steve Brock third.

MIDGE. Five flyers lined up with their Midgees to do battle. Mick Gray set a blinder of 106.88 mph with an Elfin replica (Ivor F motor). Stan Pilgrim had refined the motor a little [read 'quite a bit'; I.D.] and it went like the clappers. Justin Scott had a new Midge nicely built and finished. Geoff Hungerford flew his Cipolla powered Midge. Les Ross had his old faithful model, now red in colour, and Mike Silke used his Yin Yan powered Midge. First was M. Gray at 106.88 mph (new no pylon record), G. Hungerford was second with 89.91 mph, J. Scott was third with 88.85 mph, and the encouragement award went to Mike Silke with 81.67 mph."

LAST LAP

I would like to remind readers that we welcome your feedback and contributions to this column. If your club produces a newsletter with CL content, I would love to receive an occasional copy so that I can get a feel for the local club scene around the country, what events are in and so on. I also welcome price lists from traders stocking general and trainer CL kits and accessories, vintage stunt kits and plans, 3 line and monoline control systems, engines useful for CL competition (i.e. new and pre-owned 2.5 cc racing diesel and glo, 1.5 cc diesels, .11 racing glo, .19 to .60 stunt and big block .29, .40 and .60 speed engines), competition accessories like pans, tanks, venturis, bellcranks, pipes, heads, spinners and props; or people offering a service like custom engine repairs or modifications. I get a number of letters asking for "where can I get?" type information, particularly people returning to active CL flying. Unfortunately my knowledge of what can be obtained outside SA has been limited to overseas mail order sources. Help me to direct these people your way. Finally, I would like to thank Aussie traders who advertise their CL stock in Airborne and keep us up to date with what can be obtained locally.

Please send information, articles and photos to **Control Lines, 46 Elston Street, Brooklyn Park, SA, 5032.** Please include a stamped, self-addressed envelope if you need a reply or for the return of photos.



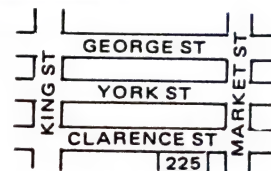
Winner of Nats CL Scale was Gary Sunderland's Eidekker. Fokker E3 has 10 cc motor. Dislers photo.



Our ace columnist and Aussie speed superno with his all-conquering machine that won FAI, with 271 kph, and Combined Speed, and set three Australian records. Photo was taken before the Nats by Ivars brother, Maris.

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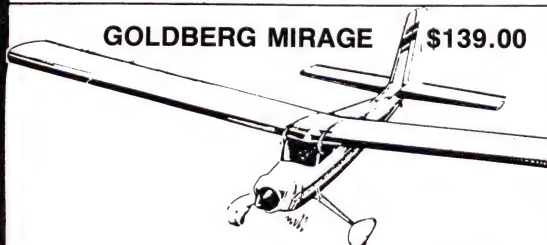
The APOGEE replaces the Windrifter but retains its light but strong built-up construction. It is a state-of-the art 100 inch thermal glider with Eppler 205 and Schumann style wing of 770 sq. ins. For 2 channel radio, easy to build, easy to fly.



DRIFTER II

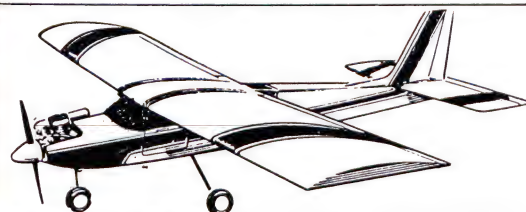
The versatility of the Drifter II makes it an exceptional trainer and competition sailplane. 72 inch span with 2 metre details included.

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Beginners pack, including 2 channel RC, glue, covering and Drifter II kit **\$179.00**

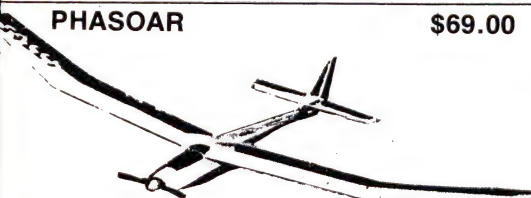


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The Mirage provides an outstanding beginning to electric RC flight. It uses a 6 cell car battery pack, helping to make it a good transition model for RC car enthusiasts. The 54 inch span kit has an all-balsa fuselage for extra-light weight. Included are a 550 motor, prop, spinner and wheels with pants. Using a 1200 mAh battery, you can enjoy over 13 minutes of flight. A 2 or 3 channel radio is required.



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Kadet Seniorita



Kadet Senior

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The PICA WACO is a fantastic biplane that is a dream to fly. Available in two sizes:

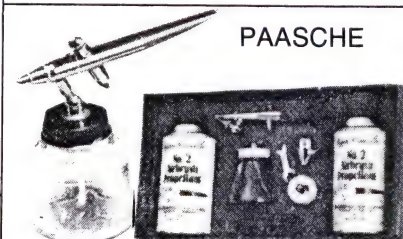
1/6 scale; 60 inch span,
40 to 60 motor, 4 channel... **\$255.00**
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Clamps:

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A must for all modellers.
2 sizes. Pack comprises 20 assorted clamps



PAASCHE

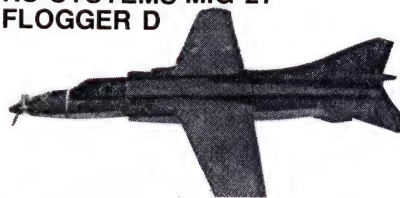
An airbrush is probably the best way to paint a model, and Paasche are possibly the best airbrushes.

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KIT REVIEW

PRICE-RITE OZONE by Bill McLucas

PRODUCTION

When my Ozone kit arrived, I could not wait to get started opening the box and sorting through all the pieces. The taskhead looked a little daunting having built only smaller control line kits but if you follow the comprehensive instruction manual and plan you won't have any problems.

All wood parts are clearly numbered and correspond to the numbers on the plan so there was no problem locating the right part for the job.

WINGS

I like to build the wings first as this is normally the most time consuming job of any model. This wing was no exception being of box construction, fully symmetrical with full span flaps. I chose to build the wing as per the instruction manual, using temporary balsa legs to support the wing perfectly flat on the building board. The leading and trailing edges are both notched for easy location of the ribs. Although this method of construction was a little time consuming. Once the wing sheeting is in place you won't have any warps in the wing which makes it well worth the time and effort. The landing gear blocks are glued to the main spar and supported by ply false ribs to make it fairly strong, to withstand the occasional heavy landing, that we have all had at one time or another. I chose to make an adjustable lead-out guide from scrap ply, but fitted the 21 grams of tip weight that was supplied in the hardware pack. I did not use the tape hinges supplied in the kit, I used the pinned plastic type from the local model shop. I found one wing tip to



be slightly heavier than the other so it became the outboard tip block. Wing tip blocks were hollowed out for lightness and glued into place. The wing was fine sanded and flaps trial fitted and hinged then put aside for final assembly.

TAIL FEATHERS

The tail plane and fin are built from solid sheet to make things nice and easy. Assemble fin and rudder, (note rudder off set to the right). Shape and sand as per the plan. The tail plane was shaped and sanded also then hinged with pinned hinges and both parts put aside for final assembling.

FUSELAGE

The fuselage was straight forward to construct following the instructions and all parts fitted well with no problems.

Before starting the fuselage, you must know what motor you are going to use, because of the spacing of the engine bearings. The motor used was an OS 40 FPS. The fuselage was finish sanded and ready for assembly.

ASSEMBLY AND FINISHING

All parts were trial fitted and checked wing, tail plane and motor all at 0 degrees without any modification. All parts were glued together paying close

attention to alignment of wing, tail plane and rudder. After final checking and sanding I covered my 'Ozone' wing using solar film and fuel proofed the nose with Balsarite. Motor, wheels and an R/C type clunk tank were fitted. The control surfaces hooked up as per the plan to give 45 degree movement each way.

FLYING

To the flying field. Final check over and C of G on the main spar, run out 65 foot lines, pull test, fuel up and ready to go. Not being able to delay the moment of truth any longer (Due to constant harassing from friends!). The motor started and tuned now was the time.

The take off was uneventful after a short roll out and the first few flights proved that 'Ozone' is far more capable than I am, maintaining good line tension through my limited manoeuvres of loops inside and out, figure eights, and inverted flight. Landings are uneventful as 'Ozone' glides forever and settles down without any problems.

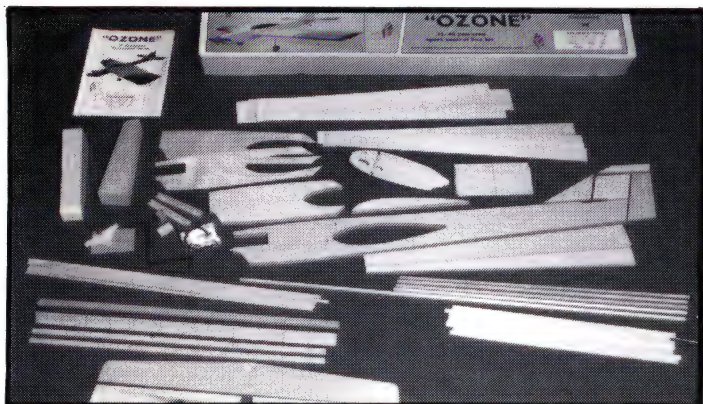
CONCLUSION

The 'Ozone' kit was a good model to build. The wood supplied was of good quality as was the hardware package.

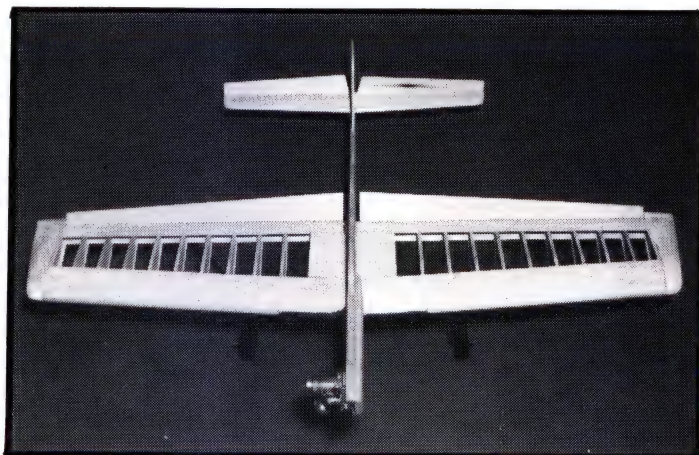
I thought the model was well priced for it's type and size.

I love the way it flies, especially the way it pulls tight loops so close to the ground when one makes a mess of a figure eight or some other silly manoeuvre that one gets wrong.

In summary a good flying model which I enjoy flying and would recommend to anyone who has built one or two control line models.



The Ozone kit straight from the kit box showing the comprehensive prefabrication, even the leading edge is shaped and notched for the ribs, and ample accessories.

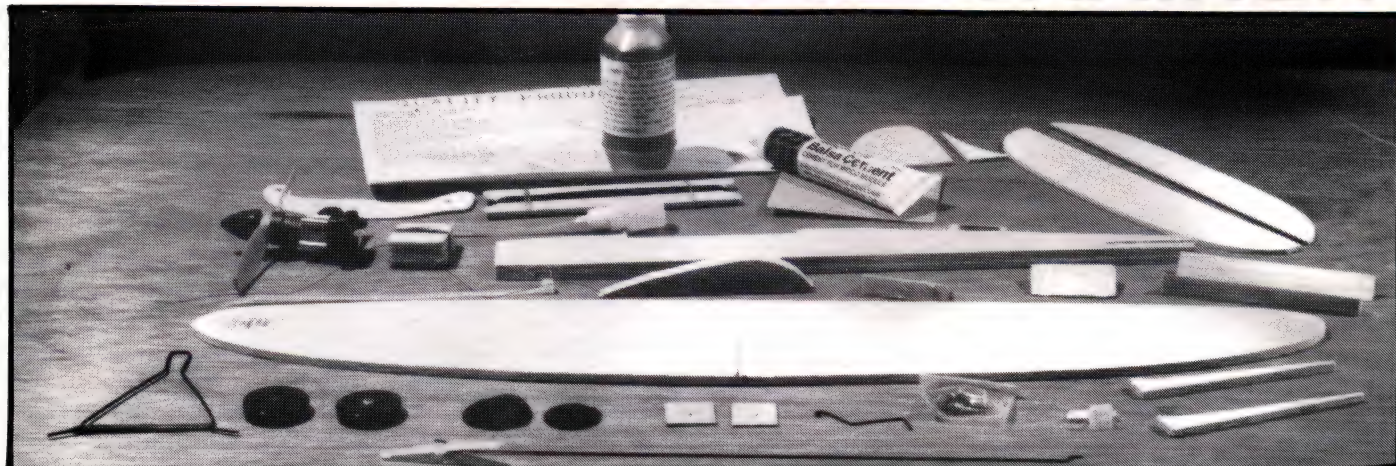


Complete uncovered model.

KIT REVIEW

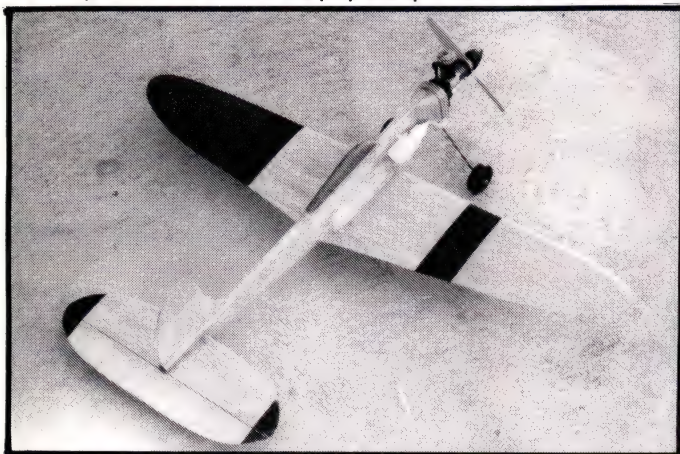
Kits available from Box 11,
Doonside, NSW, 2767.

THE DOONFIRE TRAINER

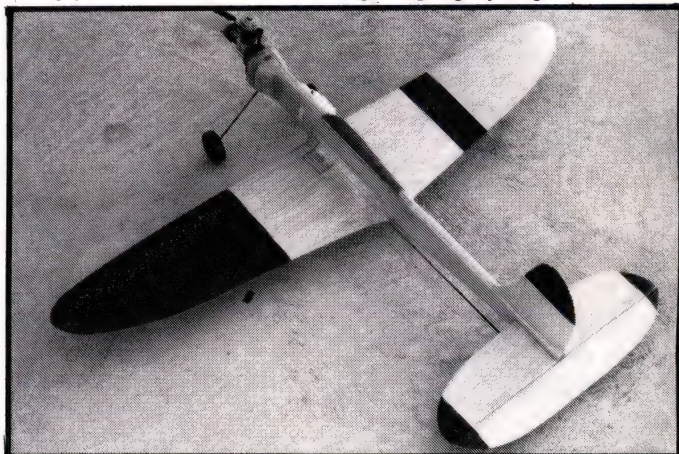


The components of the Doonfire kit laid out for checking. Note that squeeze bottle is full of dope, and becomes fuel bottle when dope is used. Aeroflyte cement provided too. Cox 049 has prop and spinner. Control lines are water

proofed thred. Wire parts are bent to shape. Only tissue and fuel proofer need be added by the builder. Elevator hinges and screws are packaged separately. Wingspan is 600 mm, the inboard wing being slightly longer.



Assembly of all parts with cyano-acrylate glue and shaping took about 2 hours. Doping, smoothing and tissue covering took abother 2 hours. Engine and controls were installed after fuel proofing with Estapol clear gloss. Fuel tank is held in place with nylon tie.



Instruction sheet shows exploded view of assembly, and is adequate. Fin offset was not great, but after attaching engine mount the thrust line was found to be offset about 2°; a good point. Very pretty little model. Reminds me of something. Wonder if the next design will be a Doonstang!



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"A .35 to .40 powered sport control line kit"

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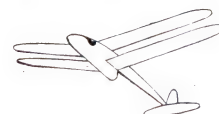
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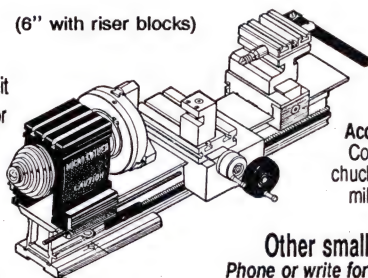


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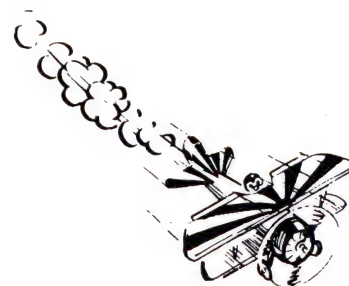
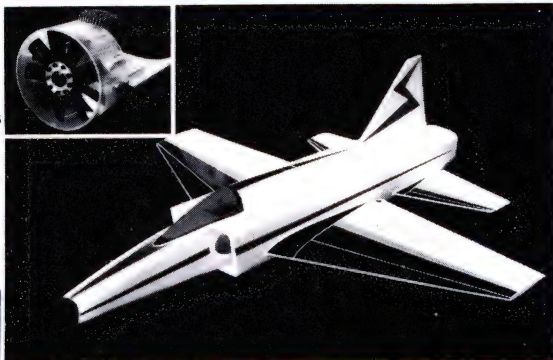
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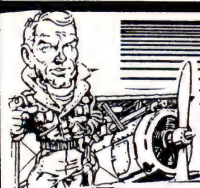
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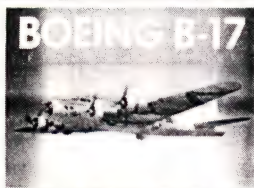
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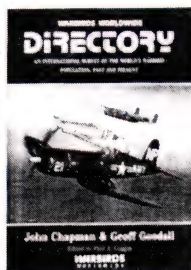
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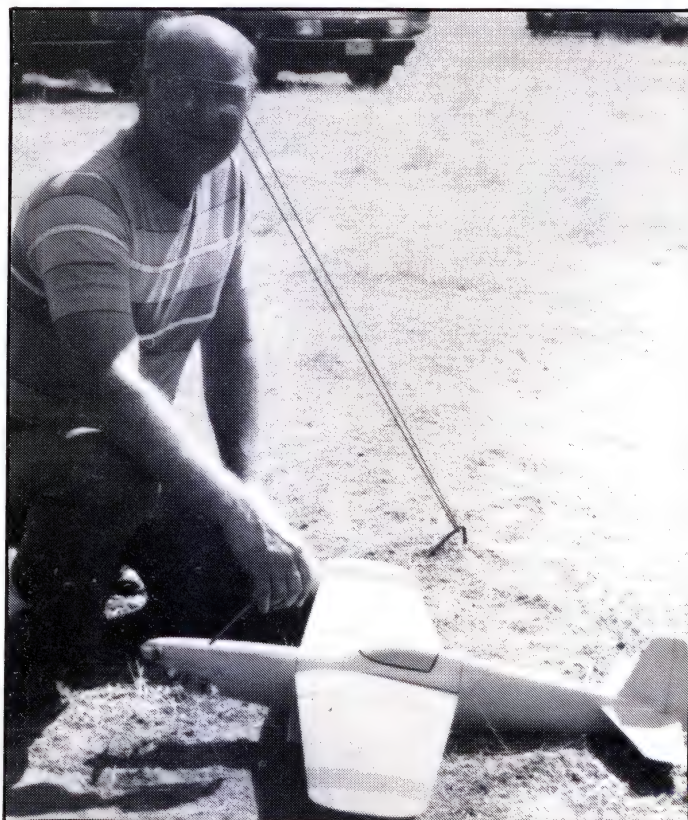
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PYLON ROUNDUP

by John Hugan



Ranjit Phelan with Midget Mustang QM, Rossi powered. Ran a 1:09 at the Bendigo Nats.



Bernard McKay from Tasmania with Folkerts QM; Rossi engine. At the Bernie said the aircraft was difficult to fly.

THE ROLE OF THE CONTEST DIRECTOR

I doubt if anyone could have complained about the efficient way the Bendigo Nats were run. As co-ordinator of the pylon events, it gave me great pleasure to hear the compliments. I can assure you that the main thing in organising is planning - those CDs who fight fires all day and do it well should not be praised. The idea is to organise early and plan well ahead for any contingency that might occur. The most important thing is to get the very best help possible. I was able to get: the VMPRA equipment; David Axon to CD for QM; Robin Gray to CD for 1/2A; Nerida Matthews to do the scoring; June Carroll as timing official; Rick Thoms as the starter; and Anthony Hugan as No. 1 pylon official. These people knew their jobs months before the Nationals. I supplied every official with a list of duties that they were expected to perform, and how to do them.

The early problem was whether there would be sufficient helpers on the day for timing and flagman duties. You just cannot expect people to travel at their own expense just to assist. Only very interested people will spend the money to help run pylon. Anyhow, with the help of the local Bendigo Club, who supplied about half the help, we were able to get by. I would like to thank Andrew Thomas for his assistance in this regard. I have attended events where the CD has not supplied score sheets, pencils, stop watches or

anything else needed. Quite often he has not organised any helpers, then he turns up late. You can imagine how well those events went.

If you are given the job of CD, please do not let everyone down. Plan the thing out well in advance. Make sure you have everything you need; equipment and labour. John Chadd has been given my list of the duties associated with every pylon official, and he has added his own thoughts. If anyone is interested, send me a stamped, addressed envelope and I will send you a copy.

At these Nationals I was able to get the list of entrants prior to the event, so the night before I made out the draw and wrote out the time sheets. This meant that we could start immediately after setting out the course and organising the helpers, which was about 8.30 am, and run seven rounds by 12.30. FAI had a bigger entry and did not finish until 2.00 pm. The days were very hot and it was no fun flying pylon. All we wanted was to get away from the field and under the shower. Unfortunately, after the event is over the CD still has work to do. The engines and airframes of the placegetters have to be processed. Measuring equipment and competent people must be available for this task.

At the Nationals I had to work out Champ of Champ scores, and write an article for the Nationals Newsletter. After that was done I

worked out the draw and wrote out the time sheets for the next day's competition. With all this planning, especially the selection of competent people for the key jobs, I had a very easy time during the running of the events. No wonder - everything was organised early.

A CD should not be a goody-goody; a person who grants favours to his mates and then hits the new guy with a rather technical penalty. You should weigh the facts, provide arguments for and against, in your mind, and then make a decision. Some decisions will be unpopular. You cannot let a blatant breaking of the rules escape without a penalty; nobody respects a weak CD. However, you must listen carefully to each protest. Another thing a CD must do is make sure that every contestant is aware of the rules he is flying under, especially if local rules are in force. The briefing session prior to racing should explain all the major points that will apply on the day. Only hit them with what they should know about.

CHAMP OF CHAMPS TROPHY

I came on a bit strong with a few words about this in the last issue of Airborne, and I wish to apologise to anyone I offended. Those people who win the Champ of Champs do so because they have the skill that will get them into the winner's circle. You will notice that some people win time and time again. They do so because

they have building and perceptual skills that are better than their competitors. I congratulate all our Champions for a job well done.

PYLON AT THE BENDIGO NATIONALS

Bendigo, unfortunately, was a very hot Nats. It was hot for the competitors and the helpers. I doubt that anyone really enjoyed the events; they just wanted to get back to the motel. I feel that the pylon was the best I have ever attended at a Nationals. The field was excellent: a very large, flat, closely mown strip which was not hampered by trees anywhere. We were able to set up the course completely in observance of the FAI safety regulations because there was plenty of space available. Actually, the field was a bit dusty, but you must realise that we were in the middle of a drought.

The events were run in a very snappy way. The person who takes the credit for this is Rick Thoms, the starter, who worked tirelessly throughout the three days to make it a success.

½A Pylon

This was won by Ranjit Phelan flying a locally designed model powered by an Enya AAC 11. He has modified the head on the engine to fit a Nelson Glow Bee head. In fact, all the winners had made this modification. Sorry guys, but to get really competitive on FAI fuel you will be at a disadvantage with your standard heads.

In the early stages Ranjit and Lance Langham had some very close races, but as time went on Ranjit maintained his speed while Lance slowed down and also received cuts. Bernard McKay, using an Enya, and Brian Steele with an ST 11, filled the second and third places, respectively. I felt that I had a very competitive aircraft, but suffered some form of fuel blockage which cut the engine back to idle halfway through the race. It would do three or four laps this way and then, for no apparent reason, give full power again. Very strange!

Results

- | | | |
|------------------|--------|------------------|
| 1. Ranjit Phelan | 685.6 | Best time 1:22.8 |
| 2. Bernard McKay | 611.52 | Best time 1:31.0 |
| 3. Brian Steele | 608.2 | Best time 1:36.3 |

QM Pylon

This, believe it or not, was won by an Airborne Cobra flown by Bruce de Chastel. He was running a custom built Nelson 21; these will soon be made available to the public. Bruce was not

the fastest, because Ranjit Phelan was initially, with his Midget Mustang-Rossi combination. Actually, Ranjit ended up breaking the Australian record with a 1:09.3; the first recorded time below 1:10 in Australia. Andrew Davies, who was a strong favourite for the event, broke his best prop, and also his engine did not like the heat, and he finished second. At a recent meeting Andrew flew a 1:13 and did 1:15s with ease. The best he could do at Bendigo was 1:17.1; most of the time he was in the 20s. Keith Harvey came third flying his immaculately built vintage QM Omega Junior model. He was also using a Rossi engine. The Omega Junior QM was kitted by Grahame Pentland at least twelve years ago.

The above is how the contestants stacked up on paper, but all that changed. The problem started when the engines were processed for capacity after the event. It turned out that Rossi engines are 3.5 cc and are over 0.21 cu in. The rules state that the engine is 0.21 cu. in. Bearing this in mind, and the fact that we must run to the rule book, we had no alternative but to disqualify the two placegetters, Andrew and Keith, and also Ranjit's Australian record. We all know that all these people were not trying to cheat; it was just an unfortunate state of affairs. The engines of the other contestants, Glenn Matthews' Picco and Brian Steele's OS, were measured, and were under 0.21 cu in, so they were elevated to second and third places, respectively. I recommend that all you people allow Rossi engines to compete in your local comps. The rule will be changed in the future to allow 3.5 cc engines, so don't panic and flog off your Rossi 3.5s. Incidentally, many of the field of 21 were using Rossi engines.

Results

- | | | |
|------------------|--------|------------------|
| Bruce de Chastel | 737.0 | Best time 1:14.6 |
| Glenn Matthews | 691.3 | Best time 1:24.0 |
| Brian Steele | 685.74 | Best time 1:20.4 |

FAI

This was the big one, with everyone ready to show that they were good enough to make the Australian team for the World Champs. I was very interested in how the new Nelson 40 engine would compare with the OS and OPS engines. From all reports from Brian Steele and Andrew Davies, they are very fast initially. In fact, Brian said that his was so fast that he had trouble keeping ahead of it. This was, of course, until it broke.



Bruce de Chastel with son Jason. Won QM at the 44th Nats. Model is a trike Cobra with custom Nelson 21 engine and Bolly pipe.

The only person who is not having problems with Nelsons is Bruce de Chastel, and he made the statement that the guys who are having problems are those who are not getting their engines supplied from him.

In the early stages there were a couple of problems that destroyed some interest in the competition. Firstly, Ranjit Phelan and Brian Steele mid-aired, wrecking both aircraft. Brian (the Animal) Steel had to resort to his back-up aircraft, whilst Ranjit (the King) Phelan had to retire because he had no spare model. Next Lance Langham blew up his No. 1 engine. After the first round Keith Harvey came out the fastest with his OS-Little Toni combination, with a time



Terry Dodds' Bolly Piel design QM; Picco 21 engine



Garry Davidson's custom built Table has holes to accept wing and tailplane. Garry is offering a discount for the first 10 orders! At the Bendigo Nats.

of 1:18.9, closely followed by Roger (the Rabbit) Langham. The winner was Glenn Matthews who flew very consistently with good times. He was running an OPS in a Little Toni model. Second was Bruce de Chastel, who broke the Australian record with a 1:14.5 in the last heat. Bruce was flying a Nelson engine in an OD Rivetts model. You should all get a good look at this aircraft; it is one of the best that I have seen. He has covered the wing completely with epoxy and glass sheet. This works as a hinge for his flap-erons on the top surface, and the bottom has two surfaces sliding against each other to seal the gap. He has a pushrod actuating the elevator and the servo is positioned so that the pushrod is dead straight to the elevator horn; this eliminates play in the linkages. Remember, his model is a T-tail Rivetts, and to get a straight pushrod set-up is very good.

COMING SOON

In response to many enquiries, I'll be dealing with the following topics in the near future:

What are the Classes in Pylon?

What is the Best Model for each Class?

What is the Best Engine for each Class?

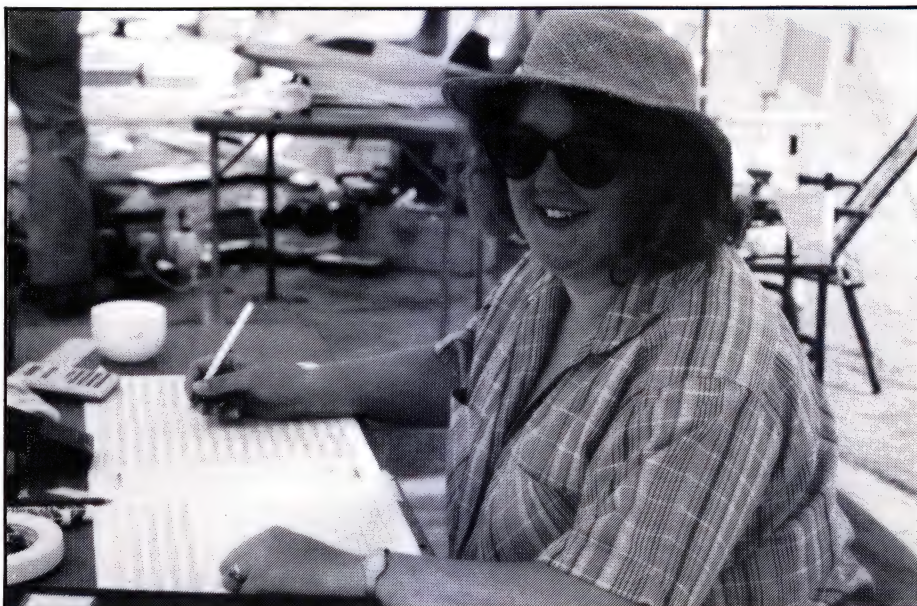
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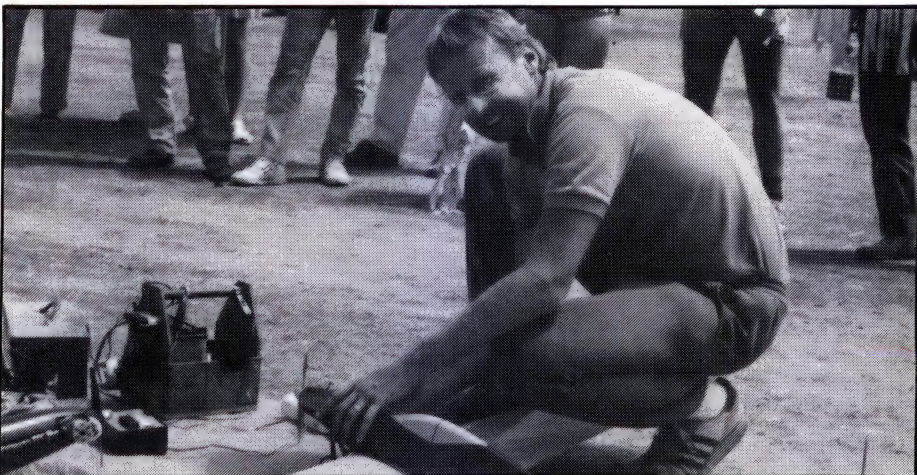
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David Axon, MAAA president, QM CD with transport to expedite decision making. Bendigo Nats.



Nerida Mathews took all the pylon scores at the Bendigo Nats. Husband Glen won FAI. Thank you Nerida, from all the pilots.



Andrew Davies, top performer in QM. Rossi engine, Midget Mustang design. Hugan photos of the Nats activity.

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At the 1991 Nats, Mike Farnan took third place in Novice Helicopter with his Kalt S/Baron.

ROTOR ROUNDABOUT



BY MAX TANDY.

SAVE THAT SPIN OR The Tail Rotor Rate Gyro

This very clever device has been largely responsible for the current increase in new helicopter pilots. For many years model helicopters have been considered to be very difficult to learn to fly; a reputation rightly earned in the early 1970s. However, thanks to competition and manufacturers' developments, the modern chopper can be mastered in a similar amount of time, or even less, than an RC fixed wing aircraft, providing that a rate gyro is used to stabilise the directional or Yaw axis.

Selecting a Gyro

Unfortunately it isn't possible to test the true effectiveness of a gyro in a shop at the time it is purchased, and they do vary in their degree of stabilisation, as well as reliability and repairability. Better quality gyros come from makers that have been around for some years, and these are usually a little more expensive, like around \$200 for a single rate and \$300 for a dual rate. The top gyros often have tiny ball bearings in the motor section of the gyro as well as in the gimbals. This reduces the current consumption and also enables the gyro to be used in any attitude, making it suitable for stabilising aircraft as well as helicopters.

Other desirable features include an independent switch to turn the gyro off when working on the helicopter's controls. This saves valuable battery power. Also, the facility to be powered by an independent battery pack may save you the expense of purchasing an extra large receiver

battery that will handle both receiver and gyro. Many people have a spare 500 mAh pack that can be utilised if the gyro has this provision (they cannot be easily modified to accept an independent power source).

How the Gyro Works

The main gyro unit consists of a small electric motor with a flywheel mounted on either end, similar in appearance to a miniature bench grinder. This assembly is mounted on two bearings (gimbals) on either side of the motor, and the whole spinning assembly is permitted to rock like a see-saw, and is balanced in the level position by a light spring.

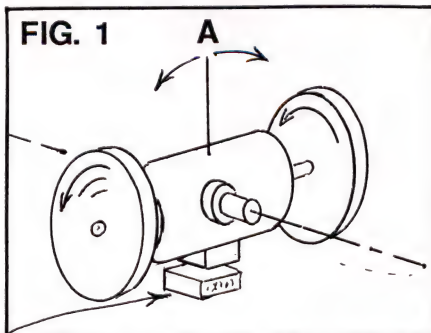
When mounted in the helicopter, the spinning assembly sits horizontally, and as the nose of the

heli begins to swing (on its own) the gyro unit will tilt slightly from what is known in Physics as Gyroscopic Precession (see Figure 1). Under the body of the motor is usually mounted an electronic device which will detect the movement from its central point, and through some complex circuitry, a signal is sent to the tail rotor servo telling it to go in the opposite direction to the swing. The amount of correction that ends up at the tail rotor blades will depend on the speed of the swing which develops in the helicopter; the faster the swing the more the correction is applied by the gyro. There are also other factors which will be dealt with later.

Why Not Manually Fly the Tail?

I can well understand that some of you will ask this question. A model helicopter without a gyro will often swing very rapidly around its vertical axis for a number of reasons. If the engine, which should be set slightly rich, breaks into a two-stroke cycle, the nose can swing 360° in about one second, particularly on a calm day, because of the sudden change in torque to the main rotors. Changing wind speeds (gusty) will also create a fluctuating torque to the rotors because airflow through the rotors changes the rotor efficiency. This also creates a swing. Thirdly, the pilot can induce a swing by too rapid a command of the collective pitch. (Tail-collective mixing helps this a little.)

Here is the answer. Yes, the tail can be controlled by the pilot without gyro assistance, but the reaction time to apply the necessary correction after the swing occurs is usually too long,



When the nose swings, point (A) tilts & this electronic sensor sends a signal via the amplifier to the rudder servo.

and the nose of the helicopter is at least 45° from the straight ahead position when arrested. And this is what a fairly experienced flyer is capable of achieving. It not only requires about 80% of the pilot's attention to keep the heli relatively straight, but it also looks ugly, particularly if the model is a scale subject. Smaller helicopters suffer more of this because of their shorter, lighter tailbooms, and therefore they require a good gyro that is well set up.

Concluding the above, an appropriate gyro fitted and properly set up in any model helicopter will make the controlling of it about 5 to 10 times easier than without, because tail rotor inputs will require about 10% rather than 80% of the pilot's attention. It also looks better in the air; the tail doesn't move! Oh, one last thing. Control of the tail from the pilot will still have plenty of authority.

Single and Dual Rate Gyros

To obtain the maximum effectiveness of the gyro during all aspects of helicopter flight; that is, hovering and up to high speed flight, manufacturers offer dual rate gyros which permit two levels of sensitivity, selectable from the controlling transmitter by the flick of a switch. To further explain the use of a Dual Rate Gyro, the user can have a sensitivity setting appropriate to hovering (high rate) and be able to select a more appropriate lower rate as the helicopter moves into forward flight giving the pilot more authority over the tail rotor control for particular turns and manoeuvres while travelling quickly. Another benefit can be obtained from the Dual Rate system which is helpful to beginners, and that is by setting two relatively high levels to be selected during hover practice to maintain the optimum performance. The reason for this is that the best initial setting of the gyro gain, or sensitivity, will change slightly with varying wind conditions and small changes in engine performance - even in one single flight or tank of fuel. Therefore the novice pilot can kick the sensitivity up a little, or it may be over sensitive and need to be a touch lower. This will be further explained in a short while.

A Good Gyro Installation

This is a subject that needs addressing because your gyro's effectiveness (and life!) can be greatly enhanced merely by simple procedures that cost nothing more than a little time and care.

Before the gyro can do its job well, the tail rotor system in your helicopter must be perfectly free with no lost movement. To check this, disconnect the tail control rod at the servo end and push the rod back and forth for at least the distance that the servo operates it. If it moves freely without sticking, re-connect it and, with the radio turned on, operate the tail control trim lever two or three clicks either way and check for corresponding movement at the tail blades themselves. If they move; great. If not; look for lost movement in the mechanical linkages and fix it. Oversize holes in levers or bell cranks are often the cause of lost movement. A very good tail rotor control system will produce a movement of the tail blade with one click either way on the transmitter trim lever, however, this may not be possible with some types of helicopters.

Mounting the Gyro Unit

This smallish square box that buzzes when it is turned on (the motor running) is responsible for detecting the swing in the helicopter immediately it moves. It must be mounted in the helicopter as close as practical to the main rotor shaft, flat on its base and in such a manner that it will not be subject to the engine vibration through the helicopter's frame. This calls for

some form of cushioning material underneath it. Too soft a mount will not allow the gyro to follow or pick up the swing of the helicopter, and too harsh a mount will allow vibration to be transmitted into the sensing part of the gyro and cause unwanted movements of the tail rotor servo. When you handle the gyro unit when it is running and connected to the radio, you will soon realise how sensitive it is. Turning the gyro unit by hand will produce quite wild servo movements (simulating the heli swinging), however, anything except gentle handling will also produce some unwanted servo movement. This is precisely why the unit must not pick up engine vibration to excess. Instructions that are provided with the unit often suggest mounting with double-sided foam tape, however, thickness and density of the tape varies a lot and most times I have examined a gyro installation to rectify a fault (poor gyro effect) I have found the mounting tape to have little give and hence the gyro unit is being shaken excessively by the operation of the engine, producing unwanted movements of the tail servo. This is very common.

It is very difficult to explain or even draw a perfect mounting system, which is so important if you want good performance and long life of the gyro, because of differing situations. However, I can offer a mounting method that will allow the user to tailor the mount to obtain good results. In illustration No. 2 we use a very soft foam plastic (used in cushions, upholstery, pillows, etc.) sandwiched between two small squares of thin plywood. The foam can be attached to the ply with contact cement or a thin layer of araldite.

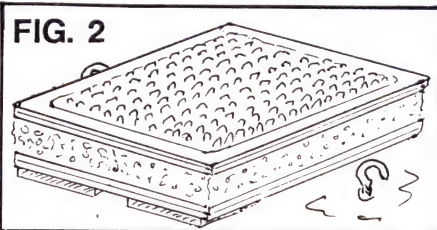


FIG. 2
From the top down: Surelok gyro tape, thin ply, 8mm soft foam, ply, double sided foam tape.

The mount can then be attached to the helicopter in a variety of ways, including small bolts and nuts to allow removal, however, most people choose the quick method of double-sided tape. The gyro is then attached to the top of the mount, and my choice here is Sure-Lock Gyro Mounting Tape. This has a very good self-adhesive backing, and is applied to both the underside of the gyro and the mating surface on the mount. As well as providing a cushion for whatever you are mounting, be it gyro, receiver, battery, etc., the tape can be easily separated by pulling from one corner only. Re-installation is simply a matter of pushing the surfaces together with a light turning motion. Generally available from helicopter specialist shops.

The final touch to mounting the gyro unit is to place a light rubber band over the top of the case. This prevents it from wobbling about when the helicopter is flying. However, it also has an important secondary function. We said earlier that we could tailor the cushioning of the mount, and we can, merely by increasing the number of rubber bands over the unit. This slightly compresses the soft foam and allows the gyro unit to turn with the helicopter more precisely. Begin with one or two bands about 70 to 80 mm long and 3 mm x 1 mm thick. More on this later.

The gyro amplifier is a separate small box which can be mounted anywhere convenient and in any attitude. If it has a Normal-Reverse switch in the body of the case, ensure that this is accessible. The ideal mounting medium for the amplifier is Sure Lock tape, as it can be re-positioned at will, however, soft double-sided foam tape, at least 3 mm thick, is adequate for this job. If the gyro has a remote on-off switch and sensitivity adjustment panel, mounting this adjacent to the radio on-off switch should make it convenient to operate.

Before going into the procedure for adjusting the gyro gain control, it is imperative that we confirm that the gyro is set in the correct sense; that is, it will oppose the nose swing of the chopper and not increase it! If the helicopter has a clockwise rotation main rotor (looking from above), and most have this, then turning the gyro or the helicopter body anti-clockwise should



1991 44th Nats at Bendigo, F3C placegetters. L to R: Rob Barbuto (X-Cell, 2nd), John Wessel (X-Cell, 1st), Simon Ventebogle (Schluter, 3rd). Very hot and very dry!



Robert Barbuto

1990 Australian Champion.

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John Wessel

1990 National Champion

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Bob Newcombe

1990 Qld State Runner-Up

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AUSTRALIAN 1990/91 NATIONAL TITLES
X-CELL 60 Placed 1st & 2nd in F3C Event
and 1st & 3rd Intermediate

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Rob Barbuto (right) 1st place '89 Nats;
Geoff Woodward (left) 2nd.

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Bill Kent, second in Intermediate, with his GMP Elite at Bendigo.



1990 NSW State Champs, Sydney. Placegetters in the Novice event. L to R: Bruce Smith (X-Cell 60, 2nd), Warren Coull (Starlite, 1st), John Fondas (X-Cell 60, 3rd). Pretty neat, guys!

produce an initial movement of the tail rotor blades which increases their pitch. This, in turn, will cause the nose of the heli to be corrected clockwise, or nose to the right. The only deviation from this would be helicopters having anti-clockwise main rotors and possibly helis with belt drive tail rotors where it is possible to have the tail blades turning in the opposite direction.

The majority of model helicopters have clockwise main rotors and clockwise tail rotors when viewing the tail rotor hub. About 20% of novices installing a gyro for the first time have it in the wrong way and the result is that the helicopter spins like a top as it becomes airborne. If a training undercarriage is being used then it is unlikely that any damage will be done. To correct the situation, the Normal-Reverse switch, usually on the amplifier, is selected the opposite way. You must ignore the words Normal and Reverse and consider it as direction A and direction B.

Gyro Sensitivity Adjustment

Firstly you must consider the Mechanical Gain that is produced by the length of the tail servo output arm. The longer the arm the more the gyro effect will be felt at the tail blades, and vice versa. If you have an instruction manual, be guided by it as to the distance from the centre of the servo arm (or disc) to the tail push rod connection point. If no details are available, make it 12 mm; it can be changed later if needed.

The gyro gain control will be found on either the main body of the gyro, the amplifier or the remote switch-selector, and can be set at 50 to 60% initially. In the case of the dual rate gyro there are a few more things to do before setting the gain

After plugging in both leads to the receiver (single rate models have only one) at the appropriate positions described in the gyro instructions, the switch on the top of the transmitter labelled Gear will control or select either gain rate after they have been set. The two gain adjusters are usually marked One and Two. Turn them both to Zero (anticlockwise). Turn on the radio, including the transmitter and the gyro. With both gain adjusters off, the gyro should not work, or very little. The aim is to identify which of the two adjusters is controlled by the gear switch in its present position. Leave the gear switch where

it is and turn up number One adjuster and then see if the gyro works. If it now operates, set it to about 60% of its travel. If it doesn't work, turn it back to zero and try number Two. If it then operates, that is, the tail servo moves when the gyro is twisted, then set number Two at about 20% and reset number One at 60%. Now confirm that when the gear switch is in the opposite position a significant increase in gyro sensitivity is obtained. After establishing which position the gear switch is in for Hi-Gyro and which for Lo-Gyro, set the low adjuster from 20% up to about 40%. This will give you a high selection and a slightly lower selection, which is suitable for training purposes.

Flight Testing the Gyro

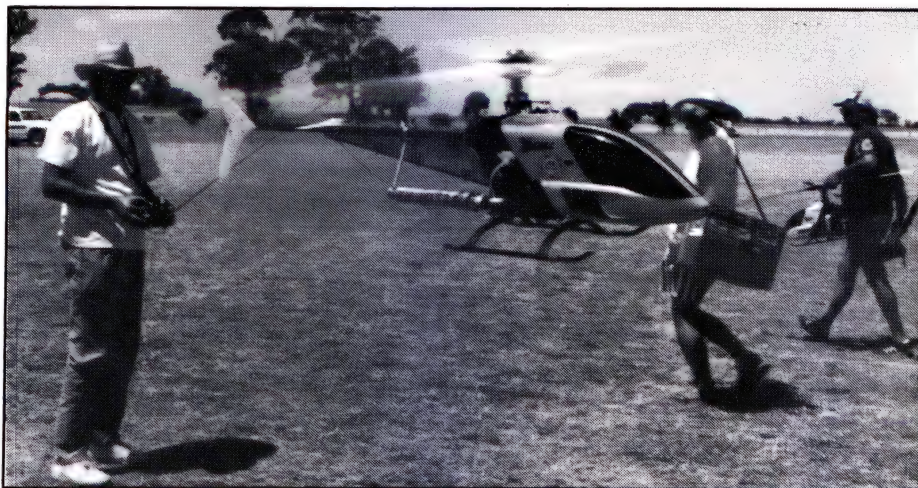
If you are able to hover your helicopter, lift it off and see how it feels. If it holds the into-wind heading with few tail corrections it is fine! However, if you feel that the tail could be steadier, increase the gain by small amounts until the tail of the heli wags back and forth rhythmically, which indicates too much gain and the gyro is over-reacting. Reduce the gain to the point where the waggle stops. This represents the maximum

effectiveness of your particular gyro installation, bearing in mind the degree of gyro cushioning, the tightness of the tail control linkages (meaning slack free, not stiff) and the speed the tail blades are operating at in the hover. This, of course, is governed by the speed the main rotors are running, which can be varied. At this time it would be appropriate to more accurately describe the in-flight effectiveness of a well set up gyro so that a reasonably good assessment can be made of your helicopter, and this is it!

When operating in an open environment, away from trees and buildings that create turbulence, with a wind of 5 to 10 kph, a sustained hover with the helicopter facing into the wind will not require any tail rotor control inputs from the operator. The gyro will maintain the into-wind heading automatically to within 3 or 4 degrees if the engine is running smoothly, and up to 15 degrees if otherwise.

Novice Helicopter Pilots

If you are not able to hover yet, and have no experienced help, then you should take particular notice of what has been offered here with regard to installing your gyro. Attention to detail will pay



At the Bendigo Nats, first place Intermediate, Julian Clutterbuck with X-Cell 60. Hovering in ready-box prior to flying.

dividends. Optimum gyro adjustment can be obtained if the Tandy Training Undercarriage is being used, because the helicopter's tail is permitted to wag while it is still on the ground, then the gain can be reduced to obtain the correct setting.

To this point we have only considered the gyro's gain control as a means of increasing its sensitivity, and if by chance you run out of adjustment and indications are that you need more, then the following measures can be taken, but try them one at a time otherwise you can run into bother. First fit one or two more light rubber bands over the gyro unit, which will allow it to follow the helicopter's nose swing more closely. If there is still not enough stability, try increasing the speed of the tail rotors by lowering both the main rotor pitch angle and the tail pitch angle. (The faster the tail runs the more effective it is.) Assuming that your equipment is operating as it should, then the fine tuning of your gyro system will be in your hands.

WORLD CHAMPIONSHIPS IN AUSTRALIA

The 1991 Helicopter World Championships will be held in Wangaratta, Victoria, from October 20th to 27th, 1991. Australia fielded a team of three in the September 1989 World Champs in Chesapeake, USA. Nineteen countries competed in the event in which our Aussie boys gained 8th in the team placings. Eligibility for the 1991 Australian team has been decided by competition results from both the 1990 NSW State Champs and the recent Bendigo Nats. Unless any of these flyers pull out, and I doubt they will, our Aussie Team will be: John Wessel, current Australian Champion and long time competition flyer; Robert Barbuto, previous Australian Champ and also a long time competition flyer; and Fred Proos, 3rd placegetter at the recent NSW State Champs. Fred is an up-and-coming competition man, whose main goal is to not just match the scores of his highly regarded team mates, but to better them. This is making a friendly competitive spirit amongst themselves that can only better our Aussie team!

THE 1990/91 NATIONAL CHAMPIONSHIPS

The conditions prevailing for both the 30th and 31st December in Bendigo, Victoria, could only be described as very hot and dry an extreme test for helicopter performance and anyone that

doesn't like flies. I would have said that nobody could have been as friendly as the guys running the events, but I think the flies beat them! (I'm sure their main diet is repellent.)

Three classes were flown over the two days, a total of 22 competitors, with the following results:

F3C (Sunday 30th)

1. John Wessel	X-Cell 60	563.5
2. Rob Barbuto	X-Cell 60	556.5
3. Simon Ventevogel	Schluter Magic	504.0

Intermediate (Monday 31st)

1. Julian Clutterbuck	X-Cell 60	200.0
2. Bill Kent	GMP Elite	199.0
3. Steve Green	X-Cell 60	180.5

Novice (Monday 31st)

1. Michael Smith	Schluter Champion	126.5
2. Tony Mansueto	GMP Elite	123.0
3. Michael Farnan	Kalt S/Baron	112.5

FROM YOUR COLUMNIST

Thank you to those people who asked for the gyro information, and in particular Nick H. from Sydney who took the trouble to convey his gratitude for our advice on solving his erratic gyro problem. We also have a letter from an MFA owner telling us of his success in obtaining updated parts from England to improve the tail control, which we hope to publish next issue.

Remember that we like to publish photos of your helicopters, and if you would like to write something you think would be of interest to other readers, feel free to keep the ball rolling!

Max Tandy, 9 Smailes Road, Jimboomba, Qld., 4280.



NSW 1990 State Champs F3C placegetters. L to R: John Wessel (X-Cell Quick-Silver, 2nd), Rob Barbuto (X-Cell L/Ranger, 1st), Fred Proos (X-Cell 60, 3rd). These guys are also our Aussie team for the 1991 World Champs.

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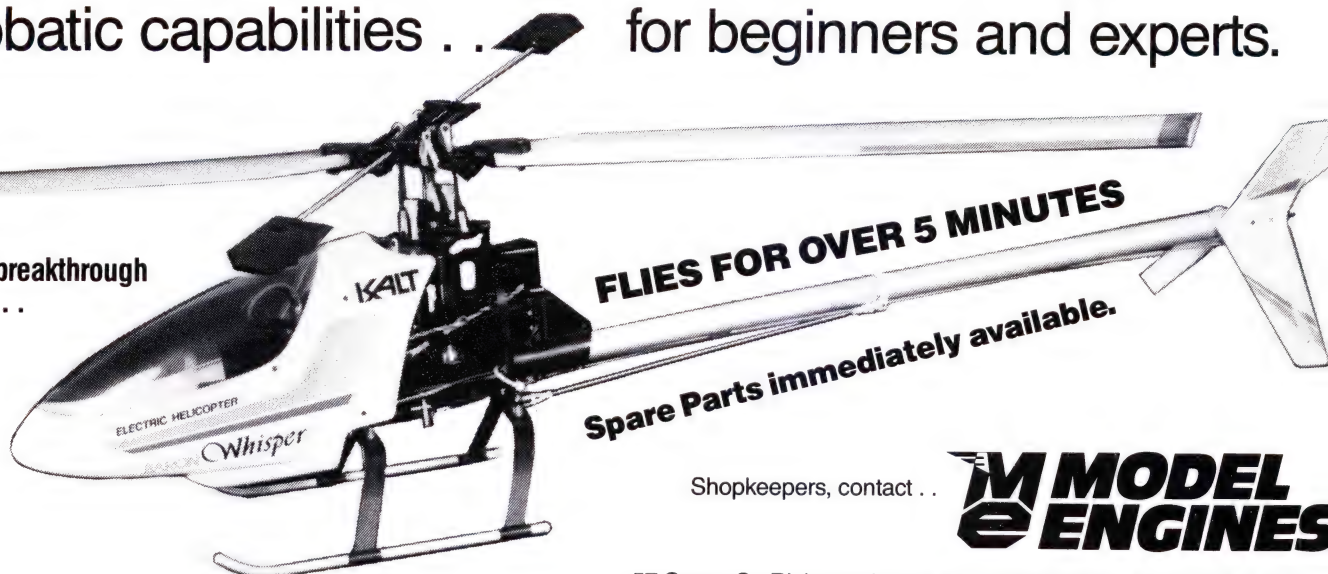
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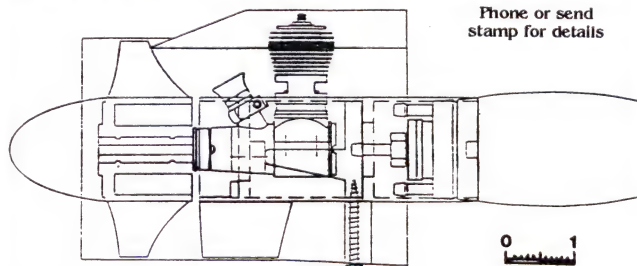
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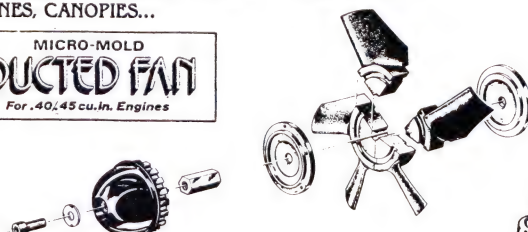
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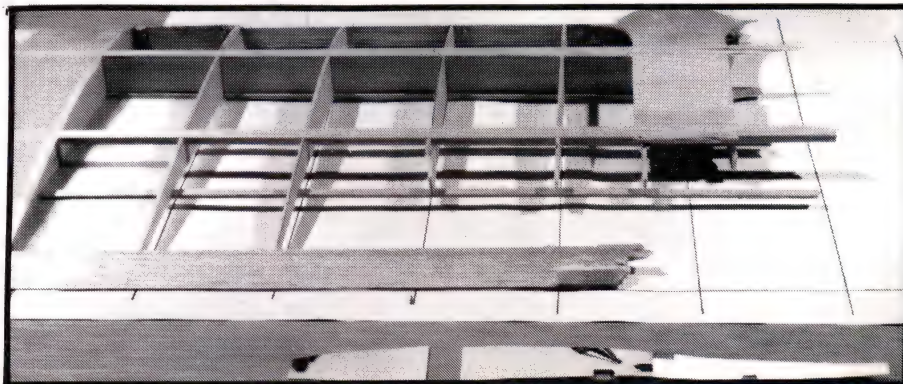
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TO BE A MODELLER!

by Vin Masters

This issue, we will show you how to join a broken wing, build a roll-over nose covering and construct a perspex engine stand to show off your engine collection.

MENDING A BROKEN WING



Step 1. Clean away damaged covering and framework.

Step 2. Draw a plan of rib and spar positions to cover the broken region.

Step 3. Pin the wing pieces down in position over the plan. Add the necessary packing pieces. In the above photo, the RH part of the wing was not in camera range.

Step 4. Cut replacement parts, spars and ribs. Remove a rib to get the correct size, if necessary.



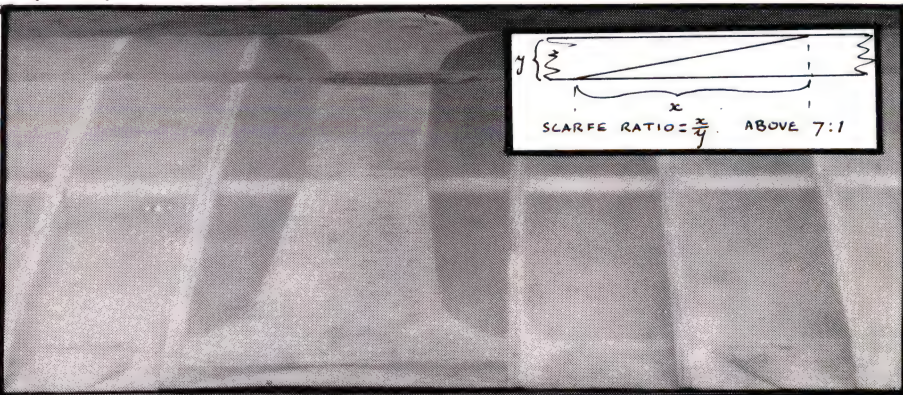
Step 5. Splice in new spar material using at least 7:1 scarf ratio (a bit less for the TE?). Do LE then TE.

Step 6. Add new ribs.

Step 7. Splice in new spars. In the above photo a thin lamination of pine has been added to the top flange of the main spar. Cap strips were then added fore and aft of this extra thickness, and were continued across the trailing edge. Centre section sheeting was added next.

Step 8. Turn the wing over and add the bottom spars.

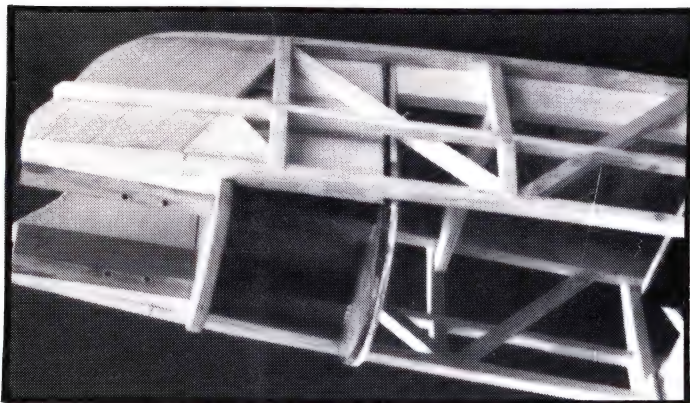
Step 9. Prepare for covering.



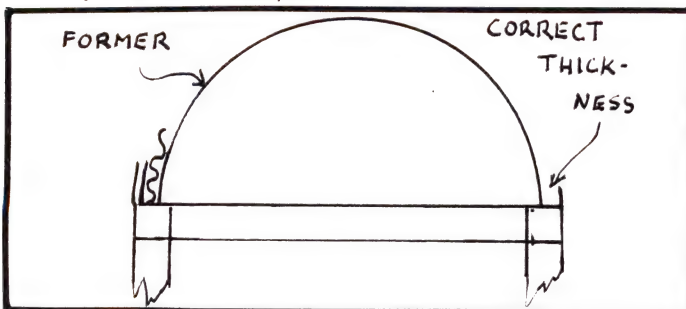
Step 10. Choose the covering to match that on the undamaged parts of the wing, and proceed with appropriate techniques.

Note that the splices and cap strips can be seen. The repaired wing is much stronger than the original for a small increase in weight.

ROLL-OVER NOSE COVERING



A. Assemble the fuselage to the stage where it is ready for covering, and only the nose is incomplete.

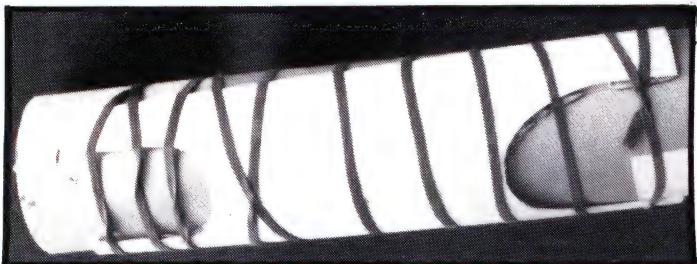


B. When the fuselage framework has been completed, it should be checked to ensure that there are no obstructions (such as knobs of glue or mis-alignment of the formers) to obtaining a good fit with the roll-over top.

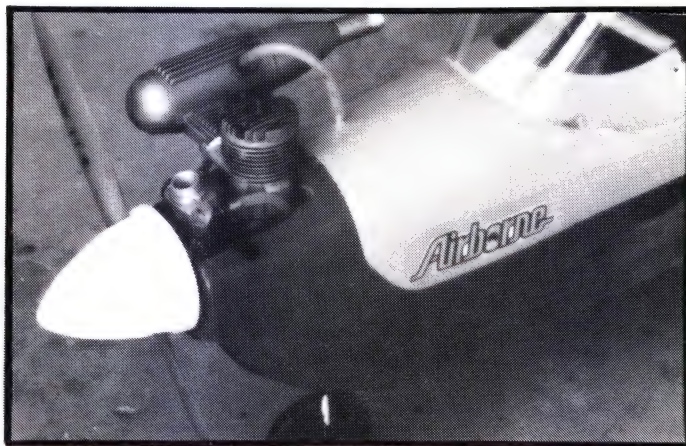


C. In order to get the size accurate, a template should be cut from cardboard. With one edge in position on top of the fuselage side, bend the card across and mark it for a slightly oversized fit. Then trim it to size, and cut out parts for the engine and cabin.

Use this template to cut pieces of balsa or thin plywood that will be laminated to form the nose covering. These pieces have to be larger than the template because the distance over the curve is greater for each layer added. Trimming to size comes later.



D. Coat the laminations lightly with slow drying adhesive, align them carefully to form a sandwich and then bend the sandwich around a piece of tubing such as a mailing tube or PVC drainpipe. Check that no lamination has slipped out of position, and wrap the assembly lightly with rubber strip or bandage. Allow time for the glue to dry properly.

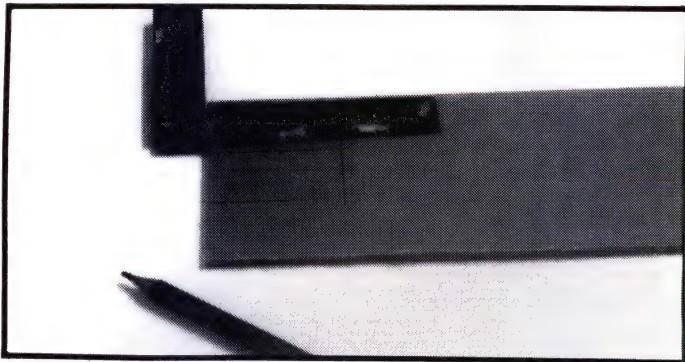


E. Remove the nose shell and, by the fit-and-cut method, sand it to exact size with a medium grit sanding block. When the fit to the framework is satisfactory, glue it into position. It may be kept in place also with rubber strip. The finishing process involved a final rub down, sealing of the edges, then covering to match that chosen for the whole aircraft.

MAKING A PERSPEX ENGINE DISPLAY MOUNT HERE'S AN EASY STEP BY STEP PROJECT TO HELP DISPLAY YOUR ENGINE COLLECTION.

1. Cut the perspex to size using a tenon saw, and smooth the edges with a sandpaper block. The size depends upon the engine: about 5 x 12 cm for a small engine of about 1 cc capacity, and about 8 x 24 cm for a 10 cc engine. The protective brown paper covering on the perspex should be left in place until the mount is finished.

Perspex off-cuts are available from Parer Plastics, 35 Garden Drive, Tullamarine, 3043; phone (03) 338 0877.



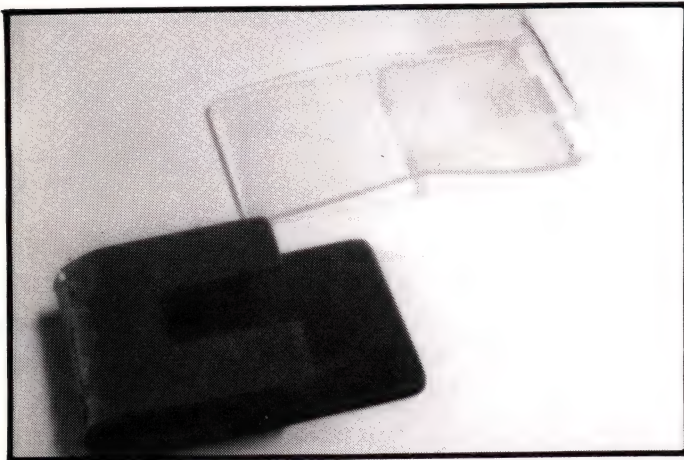
2. Draw the outline for the cut-out where the engine will sit as on a normal engine mount. The brown paper will accept pencil or biro quite readily. Do not mark or drill holes for the engine mounting lugs. Cut out the perspex with a coping saw and radius the internal corners (and external ones too). Avoid scratching the surface of the plastic where it will be stressed during the bending process.



3. Clamp the perspex in a vise, and heat it with a hot soldering iron. As it softens, push it back to form a curve over the hot iron. The radius of the curve should be about 2 cm; it can be adjusted by positioning of the iron. Note how the Panavise holds both sides of the engine mount end.

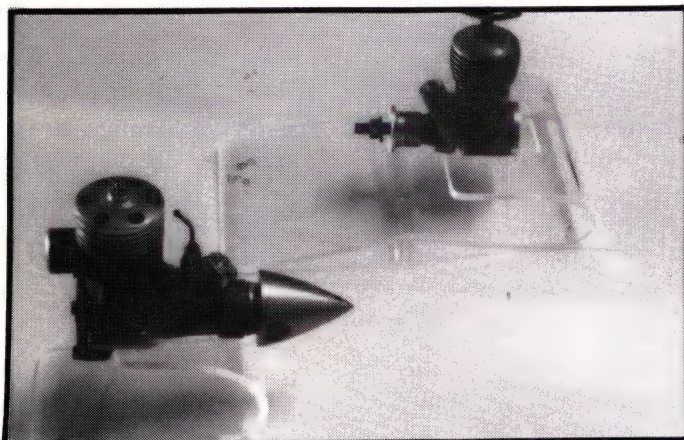


4. Bending may be continued with the iron or in boiling water, where the bending force may be applied with the use of G-clamps, since the mount has to be removed from the vise. Some dexterity is needed to avoid getting into hot water! Leave the bent perspex in the clamps until it is quite cold. It should not flex to any extent, so that the parts each side of the bend are parallel and square with each other, not skewed.



5. With the engine in position, mark and drill small holes for screws that will hold the engine on the mount. Two screws are sufficient, whether the front pair or the rear pair on the engine lugs to obtain the best balance of the engine.

6. Remove the brown paper and clean up the edges of the perspex with fine glass paper.



7. Mount the engine and place in a prominent position in the office or workshop. Note the different styles of mount in the photo.

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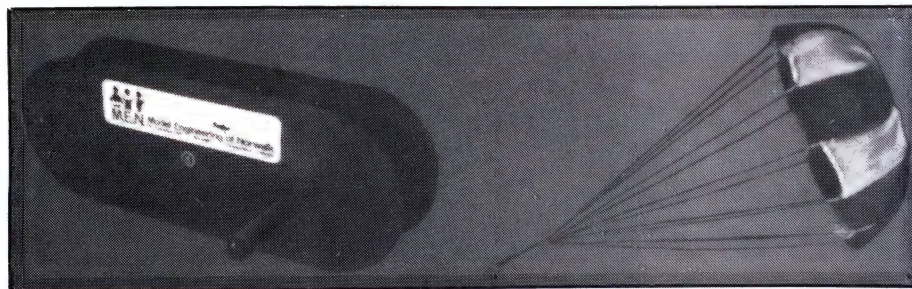


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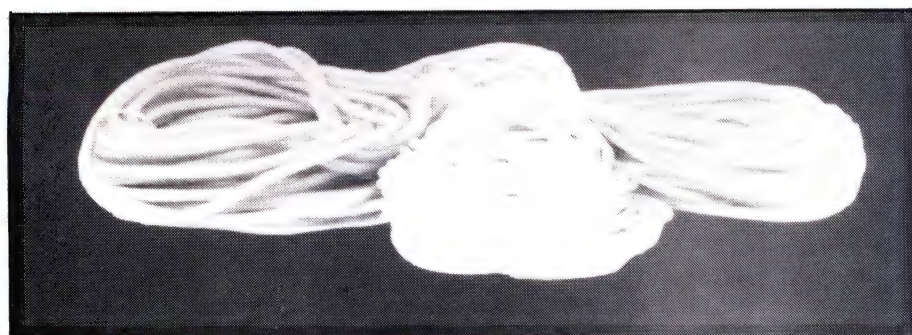


TUBE SWIVEL

A unique 3/16 ID rubber to line connector incorporating a ball swivel joint and a welded ring.

LINE SWIVEL

A light 0.03 ounce line to parachute connector incorporating a ball swivel joint with two welded rings.



HI START REEL KIT

This Hi-Start Reel is designed for fast retrieval and storage of your Hi-Start. The core slot allows your parachute or line with tow ring attached to be quickly connected to the reel. There is ample storage capacity for up to 800 feet of line and 100 feet of 5/16 rubber. MEN's semi-balanced design and size allows wind-up and unwind to proceed as fast as you can walk. The solid core can easily withstand the pressure of tensioned line without failure. The kit contains all necessary wood and metal parts and clearly printed step-by-step instructions with an exploded assembly view. Materials required to complete the kit are glue and finishing material (paint, varnish, etc.).

TOWLINE PARACHUTE

This towline parachute for use on Hi-Start or winch lines make retrieval a cinch by towing the line downwind. This twelve gore chute, designed for thru-tow service on the heaviest of model sailplanes, weighs in at .48 ounces. It's bright red and white colors are easy to find in the sky and on the field to facilitate line retrieval. The parachute is constructed with the finest available synthetic cloth, line and thread to give maximum durability.

HI-START RUBBER

Our 9/32-5/16-3/8-7/16 OD by 3/16 ID Hi-Start Rubber is the finest available for launching model sailplanes. MEN rubber is manufactured in a laid up process rather than extruded and is given a special treatment to reduce surface scratches which ultimately lead to failure during launch. An Elastic Properties graph is included to enable you to control your launch profile.

NEW! THE M.E.N. "BIG JOHN"

BY BILL NORTHRUP

"Big John," a big easy building biplane from the "work-bench" of Bill Northrup. Designed back in 1963 Big John is a proven design and proven performer with over 2 thousand sets of plans having been sold since its introduction. M.E.N.'s kit simply updates this classic, with modern building and construction techniques, designed to create a stronger, lighter, easier to build model. Weighing in at only 8 1/2 to 9 lbs. complete...this is one big model that really can perform on only a .60! Quoting Bill Northrup, "This biplane will do just about any maneuver...if you don't mind waiting a little while for them to get completed!!!! A great exhibition airplane."

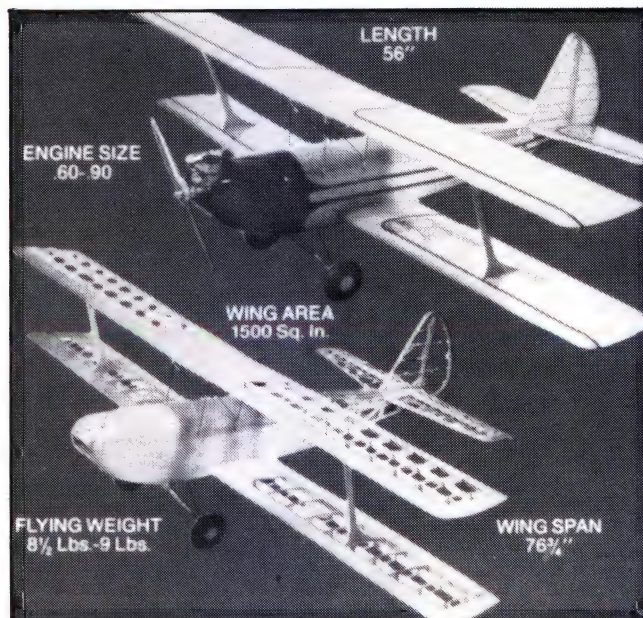
M.E.N.'s kit engineering was specifically planned for fast, easy building. Our "THRU-CUT" die cutting combined with "TRI-SQUARE-LOC" construction of lite plywood and balsa makes construction fast and simple. The inherent strength of lite plywood construction provides durability and lasting performance.

TRI-SQUARE-LOC enables us to bring to you the best in lite plywood construction, this method of squaring, straightening, and holding parts in relation to one another revolutionizes construction in lite plywood.

BIG JOHN is designed for four channel radio control operation with .60 to .90 model engines. The 76 1/4" wing span combined with 8 1/2 lbs. flying weight gives a wing loading of 13 ounces per square foot.

The kit features THRU-CUT die cutting, quality materials, rolled plans, building instructions, wing jig building fixtures, complete hardware package, pre-bent landing gear and cabane strut wires. Building time for the BIG JOHN is 25 to 45 hours.

The following items are needed to finish the model: 2-4 1/2" wheels, 1-1 1/4" wheel, 1/2" wheel collars, 3/2" wheel collars, a 12-16 oz. fuel tank, fuel line, throttle cable, elevator and rudder pushrods, glue and covering material.



For these products see your local hobby shop. If not available, ask your local hobby shop to order direct from Kraft Systems.

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Affiliations

As at 31st December 1990, affiliations by State & Territory were: MAAQ 1250; RCAS(NSW) 2171; NSWFFS 75; CLAS(NSW) 111; ACTAA 157; VMAA 2142; TMAA 158; SAAA 577; AWA 573; and NTMAA 149; for a total of 7363. This is greater than the total membership for 1989/90. Most clubs have increased membership, but some have fewer members and a couple of clubs have disappeared. Tingalpa in Queensland remains the club with the largest primary membership, with 196, more than the total membership of some States and Territories. The second largest club in Queensland has just half its membership. P&DARCS in Victoria has the second largest primary membership with 176. More than 50 clubs still have no junior members. 1914, or nearly 26% of the total membership, were not members last year.

Combined World Championships

There was time to have just a brief notice inserted in Issue No. 103, but you should know that Australia will host the combined World Championships for RC Aerobatics (Class F3A), Helicopter (F3C) and Pylon Racing (F3D) at Wangaratta from the 20th to 27th October 1991. Italy was to have hosted them, but for several reasons the Bureau of International Aeromodelling Commission (CIAM) of the International Aeronautical Federation (FAI), at its meeting last November, decided to withdraw its approval. I had a telephone call at 2.00 a.m. on a Saturday - probably 4.00 p.m. Friday in Paris - telling me that Australia was the Bureau's first choice to host the Championships in lieu of Italy. I was not able to accept immediately. I had to contact all the State and Territory Associations for their agreement, as well as a group which was organising a bid to host the same events in 1993. The majority of the States and Territories agreed, and sufficient sponsorship was obtained to warrant



The Stevenson family, three generations of aeromodelers. A privilege to know them.

going ahead. After several international phone calls and faxes, Australia was granted the 1991 Combined World Championships.

Elsewhere in this issue you should find a call for assistance from the organisers. They need your help - financial, moral and physical - to make the championships a success. The work may be hard and it may cost you in time and money, but you will have the best opportunity to see the world's top RC aerobatic, helicopter and pylon

racing flyers.

Few of us realise the magnitude of the task that the organising committee has accepted. Under CIAM rules, it must provide the costs (airfares, accommodation and meals) of three jury members for each event. Following the precedent set by the USA in 1989, two members will be on all three juries - Tony Aartz from Holland and Leo O'Reilly from Australia. Ron Chidgey (F3A), Horace Hagen (F3C) and Bob



1991 Free Flight National Champion, Keith Murray, receives his silver tray from MAAA President, David Axon.



1991 Control Line National Champions, Graeme Wilson and Brian Randall.

Brown (F3D), all from the USA, will be the other members, subject to CIAM approval next March. In addition, the same costs of ten judges for F3A and five for F3C must be paid. Only one judge for each event may be from Australia, and all judges in each event must be of different nationalities, and again subject to CIAM approval. At the present time Australia, China, Japan and the USA are the only non-European countries which have judges approved for aerobatics. For helicopter the situation is worse: Japan and the USA are the only countries outside Europe with internationally-approved judges. We are attempting to have a helicopter judge approved, and New Zealand, Canada and Ireland one for aerobatics, but even so, most judges will have a return air fare from Europe paid. At the present time sponsorship to cover nearly half of the costs has been obtained. The organisers have accepted as a condition that the MAAA will not be financially committed.

The organising committee has accepted responsibility for general matters, although the actual running of the individual championships will be the responsibility of the Australian Pattern Association, a helicopter committee and a pylon racing committee.

The manpower requirement is large. At least ten pencilers are required for the F3A judges, fifteen lap counters-times and pylon marshalls for F3D, line managers and operators of RC scanners at each of four flight lines, refuellers at F3D as well as drivers, computer operators, souvenir sellers, rubbish collectors, and so on. Not all jobs will be glamorous, but all will be essential.

The organising committee has prebooked accommodation in and around Wangaratta. A shared room for the nine days of the competition will cost \$325 per person. The venue for all events is Drage's Air World.

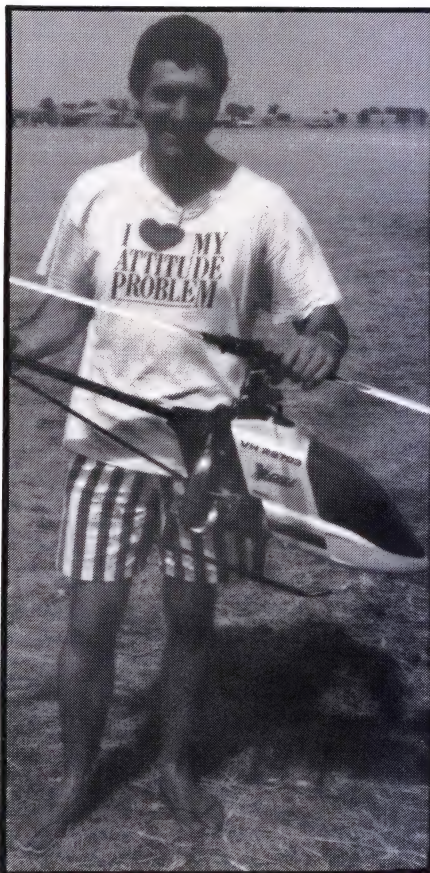
I hope to see you at Wangaratta in October.

Safety 1

There may have been other incidents of which I am unaware, but at least two experienced flyers were injured by their models during the recent Nationals. One, a scale flyer, had his left forearm slashed by the propeller of his model. He flew the round before going off to have four stitches inserted to close the wound. The other victim of a propeller, of a CL vintage stunt model, was given four or five slash marks for a moment's inattention. Propellers have no respect for person or status; they will injure the tyro or expert given the opportunity.

Safety 2

A US magazine has recently reported the in-flight failure of a Dynathrust propeller, resulting in the loss of the aircraft involved as a result of the large imbalance. I have recently been told of similar failures of another brand, but I warn that you should not let your propeller give you a headache that its namesake (Aspirin, Paracetamol and Codeine) cannot cure. It is usually necessary to start your engine from in front, but do not do so in a sitting position and, if possible, start it at low throttle. Move to the rear to remove the glo-plug clip and to make adjustments. Make sure that no-one is standing in line with or in front of the propeller, and if you raise the nose of the model to check for lean running, make sure that no-one is endangered. Discard any propellers with nicks or other damage. A cartoon in Model Aviation a few years ago showed a model fitted with a circular saw blade instead of a propeller. It could just as well have been throwing knives.



Steve Green was 3rd in Intermediate with this X-Cell 60, at Bendigo. More philosophy in Max Tandy's column this issue.

Rule Book

I apologise to those who believed me when I wrote in a recent issue that Change 5 to the Rule Book had been posted. The fact is that this column is written with several weeks lead time - this is being written to meet an 18th January deadline; You will probably read it late in Feb. or early March. When I wrote that the Change had been posted, I had just checked with my contact (the work was done in Brisbane) and had been told that the pages were being drilled and trimmed and would be despatched the following week. The fact is that they were received in the first week of December and were posted out to those who had paid for the previous Change within two days. (Owners in Queensland were sent theirs from Queensland.) There was a decline in quality of the Change - for example, some pages were not trimmed to size - and there have been complaints about the compressed type-face used on some pages. These pages are being reprinted and - dare I say it - could even have been posted by the time you read this.

Wings

I also wrote in the last issue that both Gold and Bronze Wings would soon be available. Again, there is a delay. The wings have been made but the design is unacceptable, mainly because the central badge, although comprising the elements of the MAAA badge - kangaroo, boomerang and the letters MAAA - has them re-arranged. The matter is on the agenda for the Conference in February.

1991 Council Conference

It will be history by the time you read this, but the 1991 Conference will be held over the

weekend of 9th & 10th February. Besides the fixed items (Financial Statement, Budget, Fee-setting, Reports and so on), among other things the Council is to consider proposals to:

- change some (constitutional) rules and by-laws;
- allow the Victorian Free Flight Society (VFFS) separate, direct affiliation with the MAAA;
- hold the noise level limit at 96 dBA until 1992;
- pay the entry fee and accommodation costs of team members to international competitions; and
- determine how MAAA funds could best be used to help members.

Various constitutional rule change proposals are intended to:

- amend the voting system to require a majority of affiliate membership represented agreeing as well as a majority of States/Territories;
- remove the voting rights of the Officers of the Association at Council and other conferences and for postal votes by giving the President a casting vote if required;
- remove the requirement that the President, Secretary, Treasurer and Technical Secretary reside in the same state; and
- give automatic nomination to the Association's Hall of Fame to any member of an Australian team gaining a first, second or third place in a World Championship.

I will report the decisions of the conference in the next column.

1991 Trans Tasman Events

Australia is to host the RC Scale Trans Tasman at Rockhampton over Easter, and the CL Trans Tasman in October. Unfortunately, the CL event is at present scheduled to be held at the same time as the RC World Championships, so there may be a change of date.

The 44th Nationals

The 44th Nationals, hosted by the VMAA(Inc), were held in and around Bendigo from Dec. 29th to Jan. 5th. They had the best attendance of any Nationals, with contestants not only from the south eastern states but from the Northern Territory, Western Australia and Central Queensland as well. (The enthusiasm of these flyers to attend a Nationals puts most of us to shame.) Unfortunately, the weather on most days was hot and windy, but the last day was cool with some heavy rain. Nevertheless, scores were posted for all events, although many who entered elected not to fly. Old Timer Texaco was particularly affected; I believe that only 17 out of over 50 entrants flew. Some who did fly had their models suffer structural failure in the turbulence.

The event with the most entrants - Hangar Rat - is not even in the Rule Book. The inspiration of Max Starick, it was first listed, I think, at the Waikerie Nats, and it has become increasingly popular. I watched for an hour or so. At any one time there were usually ten models airborne, some skimming the floor, others knocking the ceiling, but all in all, fun for all.

Those in the know at the auction reportedly obtained some bargains. Our Tech. Secretary, Ron Ericson, found and bought a DC350, the first type of engine he owned as a youth. Somehow, our President, David Axon, resisted the opportunity to buy another pulse-jet engine but he did take delivery of a kit he purchased at the last Richmond Nats. Myself, I bid briefly for a partially completed scale kit but commonsense prevailed; how could I add it to other uncompleted models I already have?

Overseas visitors to the Nats included John

Pond (for the seventh time) and Art Adamisin who conducted a popular CL stunt clinic.

The Nationals were the trials to select teams for RC Glider (F3B), RC Helicopter (F3C) and RC Pylon (F3D) World Championships, and for a team for the Trans Tasman RC Scale. I incorrectly announced at the Nats that a team would also be selected on the Nats results for the 1992 RC Scale World Championships, but because I had somehow overlooked giving that information to the State and Territory Associations earlier, I have had to advise the would-be team members that a new trial will be required. (I should explain that the rules require the team to be selected at the Nationals held immediately prior to the World Championships. However, the 1992 Nationals are scheduled to be held at Waikerie in late April, just a little more than three months before the Champs, and too close for team selection.)

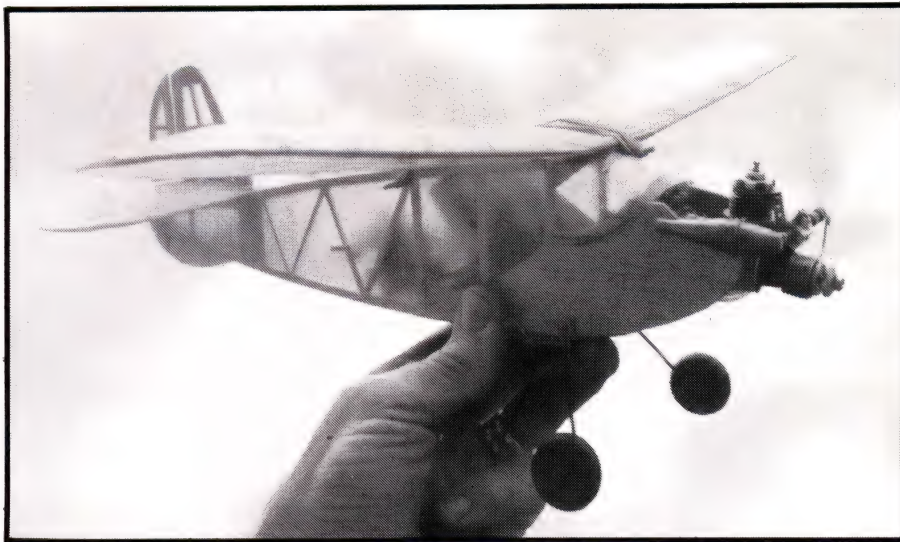
Only one possible insurance claim resulted from all of the events at the Nationals, and that was from a CL Combat model being cut free of its lines. The model in free-flight hit a caravan used by the caretaker of the sports oval being used.

1991 World Championships

Because they will be held in Australia, we will have full teams for the RC Aerobatics, RC Helicopter and RC Pylon World Championships. We will not have a complete team for RC Glider in Holland, but should have full teams for the FF Glider, Rubber and Power Championships in Yugoslavia. There was a call to re-open the trials for two of the events to be held here (some flyers had not tried for a team place because they could not afford the cost to travel to Italy), but the Council determined that the rules should not be changed.

MAAA Instructor Courses

The MAAA Chief Instructor, Steve Vickers of RCAS(NSW), recently conducted an Instructors' Course in Tasmania. I believe that he answered the questions of some who had their doubts about the scheme. Remember, a club does not need to accept the instructor scheme nor the proficiency scheme, but the former ensures a minimum standard of training and the latter a



The Airborne Gumbut TOT, built from the plan, with fuselage slightly wider to suit the Cannon G Mark .03 motor. Wing and wheels held with rubber bands. All-up weight 5.5 oz (160 gr). Not totally successful; overly sensitive to rudder input. Will sort it out in the new year. Model and photo by Peter Hardy-Atkins.

minimum standard of flying acceptance for public flying displays. The following examples may not be proof, but they should go some way to convincing you that the schemes have merit. First, members of at least one club have their trainers up for sale, having progressed to a more advanced type. Once, a model did not survive its owner's training process. Second, RCAS(NSW) recently had a model flying display with over 120 different flyers participating. Only by insisting that all would-be flyers were of gold-wings standard could the organiser satisfy the requirements of CAO 95-21 on pilot proficiency at displays. The systems are proven. When will your club adopt them?

Noise

I had a telephone call from a worried club President; his club's field has been the subject of noise complaints from neighbours. Perhaps the complaints were justified; a few members started flying at 7.30 a.m. on a Sunday. The situation varies from club to club and, although

the Association has noise limits for noise sensitive areas, each club must decide to implement rules. It is possible to reduce the noise of most types of model to 96 dBA or less by fitting an effective muffler and proper propeller selection, but the will to do so must exist. Imminent loss of a flying field should strengthen the will considerably. It may be prudent, if your club has not already done so, to seek planning permission from your local council. It is tedious but it is best done before your field has houses as neighbours.

Noise is not the only threat. A Melbourne club has been advised that it must vacate its field because of conservation concerns. I have had different stories: one that more trees are to be planted; the other that club members disturbed a pile of stones to build a barbecue, stones that had been piled by club members years ago in field clearing operations. The club has used the field for some twenty-five years, and a rare grass species, reportedly in danger from the club activities, still thrives. What is enough?

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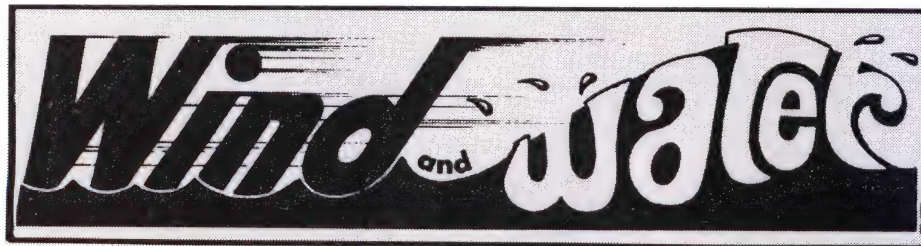
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R.I.O.R. Fleet sailing at the Nationals, Canberra. Who remembers this skermish?



AUSTRALIAN MODEL YACHTING ASSOCIATION COMMITTEE FOR 1991

The new committee is as follows:

President -	Alan Drinkwell	Vic
Vice President -	George Manders	Qld
Secretary -	Iain Kirley	NSW
Treasurer -	Michael Bell	WA
Registrar -	Hub Bell	WA
Newsletter Editor -	Bruce Kennewell	NSW
Technical Officer -	Frank Russell	NSW

During the AGM the most significant decision made was to give approval to Victoria to apply to run the RM World Titles in 1996. This will, hopefully, be the second World Titles for radio controlled yachts held in Australia. The EC12 World Titles were held on the Gold Coast in 1987.

There have been no increases in Association fees; they are still \$5.00, payable through State Associations; and boat registration fees are \$3.00. Completed certificates are to be forwarded to the Registrar with a stamped, addressed envelope so that there will be no delay in the return of certificates.

THE NATIONALS — ADELAIDE

The National Titles were held for three classes of radio control yachts at West Lakes in Adelaide over the period from January 5 to 13. The EC12 Titles were cancelled due to a lack of sufficient entries. The entries in the other classes included

one German, Janusz Walicki, a previous RM World Champion, and eight New Zealanders.

R10R — 5th to 7th January

This class was held in variable conditions, with wind strengths of up to 12 mph in the early periods, dropping to 5 to 8 mph towards the end. However, the locals and the two New Zealanders found out quickly that Walicki's boat was quick in any conditions, and by the end of the three days his 19 wins and 4 third places gave him a comfortable win. Hub Bell (WA) and Phil Page (NSW) fought out second place, with Hub's overall consistency of finishing near the top of the pack gaining him second place, 2.3 points in front of Phil.

RESULTS (22 entrants)

1. J. Walicki	FRG	23.0 pts
2. H. Bell	WA	89.6 pts
3. P. Page	NSW	91.9 pts
4. M. Newman	NSW	110.6 pts

RM — 8th to 10th January

The wind for the RMs was light, usually in the 3 to 5 mph range, and once again Janusz Walicki showed the way, finishing with 17 firsts and a third, resulting in a score, after discards, of 0.0 points. Janusz's boat is his own design called Skalpel, and the boat was for sale with three rigs and radio control equipment - cost about \$7,500. There was a lot of interest in the boat, but the

cost scared off buyers. With Janusz leading the way, 2 Australian and 2 New Zealand skippers fought for the minor placings.

RESULTS (31 entrants)

1. J. Walicki	FRG	0.0 pts
2. D. Baker	Vic	49.5 pts
3. P. Page	NSW	50.8 pts
4. T. Fowke	NZ	73.1 pts
5. D. Watson	NZ	81.4 pts

With Janusz winning both the RM and the R10R Titles, he picked up a number of prizes donated by sponsors. He subsequently presented these prizes to other skippers that finished lower in the order, as an incentive to continue competing.

RA — 12th & 13th January

The RAs competed in wind strengths that varied from light on the morning of the first day (0 to 5 mph), to medium strength (10 to 15 mph) during the afternoon, and back to light on the second day. The temperature stayed in the high 30s to low 40s. In contrast to the R10Rs and RMs, there was no clear leader at any point. At various stages different skippers looked as if they would win. At the end of the first day Hub Bell (WA) looked as if he had a clear lead, but during the morning of the second day both Rod Clack (Vic) and Glen Pascoe (SA) started to sail consistently. When the OOD called it a day after 27 races, Rod Clack had won the Title. The evenness of the fleet showed up in the results, with 8 of the 13 skippers competing winning races, something that didn't occur in the other classes.

RESULTS (13 entrants)

1. Rod Clack	Vic	51.6 pts
2. Hub Bell	WA	57.5 pts
3. G. Pascoe	SA	69.5
4. A. Drinkwell	Vic	84.9

MONARO CUP PART 2

The Monaro Cup Challenge was finally completed on 14 January at Renmark on the way back from the Nationals. You may remember that

the final best-of-four sail-off had to be cancelled last July due to lack of wind. Well, on the Monday we had some wind; fairly light but it was fairly warm - in the low 40s.

Glen Pascoe and Bruce Kennewell sailed the first race, with Glen taking the race. Riverland 1: Monaro 0. In the second race Glen started for Riverland and handed over to Les Gullickson to sail the race but acted as tactician. The race was close but resulted in another win to Riverland. 2: 0. Bruce Kennewell, after losing two races, handed the transmitter to Jeff Jones and said "It's your turn." Jeff and Les raced in close company, but Jeff could not pull back the slight lead that Les won at the start. 3: 0. Monaro had to win race four to keep alive any chance it had, and Jeff looked at Bruce to see who was to sail the race. The decision was easy: they gave the transmitter to your scribe; I was to lose the Cup. I lost it in the correct manner. I lost the start, only by five seconds, but I was able to work the very minor wind shifts up the first leg, surprising everyone, including Les, and I was in front at the first mark. All I had to do now was cover and sail cleanly. As a result of a minor wind shift I missed, Les was in front again by the third leg. However, all was not lost. I picked another minor wind shift and I was back in front and held it into the last leg. Everyone was now awake and giving advice. I took some and lost by half a boat length. Riverland 4: Monaro 0. I must admit that the fourth race was one of the most exciting and energy-taxing races I have sailed. I must congratulate Les and Glen for their sportmanship during the initial knockout rounds and races. They sailed well and deserved to win.

Why did I lose the race? Simply, I got the controls mixed up. The yacht could have sailed itself to the line without me adjusting the controls. My transmitter is set up for Mode 1; i.e. throttle



R.I.O.R. in action in the ACT. KA325 - Bill Kiewan ACT, KA225 - Steve Crewes NSW -at Bowen Park. Photo from the Columnist.

(in this case, winch) on the right; and Bruce's transmitter was set up for Mode 2. All I can say is thank goodness I was not flying an aircraft or it would have been back to the drawing board.

Well, it's back to the Riverland about July in an attempt to bring the Cup back.

NEW EQUIPMENT ON THE MARKET

While at the Nationals David Black showed me his new single-ended rigging screws and eye-bolts. The rigging screws are plated to prevent corrosion and can be used for kicking straps or shrouds. For further information, David's address is 11 Patwin Street, Oxley, Qld., 4075; phone

(07) 379 6346.

Another Queensland product now available is a tapered carbon mast and fittings. Further information is available from George Manders, 115 Meadowland Road, Carindale, Qld., 4152; phone (07) 398 3634.

NOTE

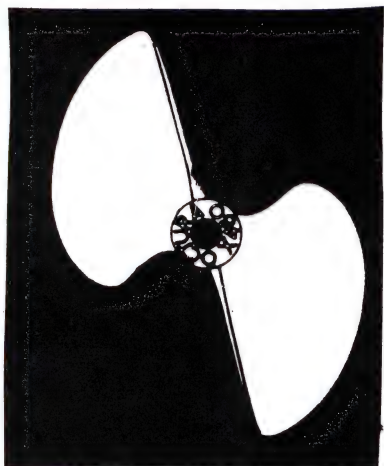
If you have any problems, please write to me at **RMB 431, Macks Reef Road, Via Bungendore, NSW. 2621.** Please enclose a stamped, self-addressed envelope for a reply. Also, if you have recently built a yacht, please send me a photo, as other readers are interested.



NSW State President, Wal McDonald sorting out a sheeting tangle on his Marble Lead. The well prepared skipper, knows that comfort contributes to efficiency. Photo by I. K.



Frank Russell designed Panda at Bowen Park. Alt - plan available from Airborne. Check the plans list in recent issues.



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FREE FLIGHT TOPICS

by Merv Buckmaster

DOIN' WHAT CUMS NATS-URLY

The magic of free flight still weaves its spell for a few, but it must have almost evaporated in the heat at Bendigo at the start of January. Nats reports will be found in FFDU (from D & J Thomas, 46 Rondelay Drive, Castle Hill, 2154) and Flypaper (from the VFFS, 7 Leslie Road, Gisborne, 3437). They are brief, in spite of larger than average entries, probably due to the debilitating weather conditions, but the reports do express some amazement that such high standard flying actually took place. Placegetters are listed elsewhere in this issue.

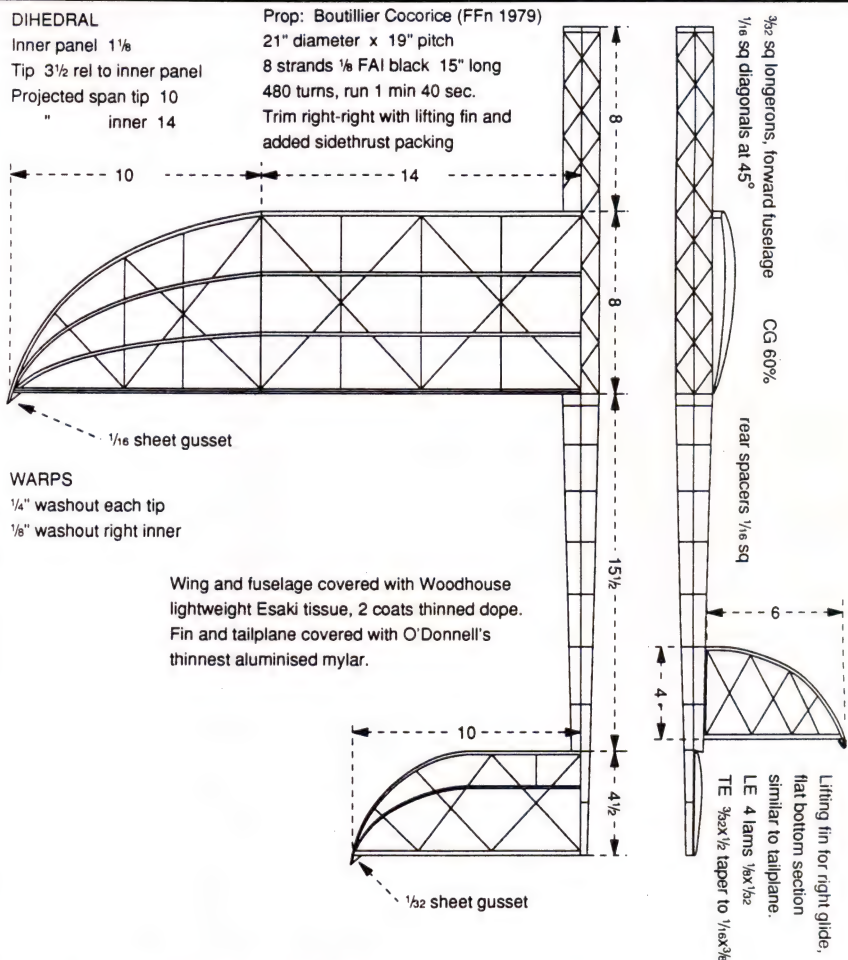
Developments continue, as has always been the way in free flight. Adolph Hass is using boron filaments in his peanut tailplanes. FAI models have made open power models obsolete, and multi function Wakefield, oops, that's F1B front ends can be purchased ready to go.

The free flight fraternity worldwide is resisting the introduction of mufflers (in some countries they are called silencers for political reasons), but since free flight is as much a power game as any other event, tuned pipes should be accepted to preclude the hassles of defining and processing muffler specifications (which is impossible on the flight line).

The original intent that P30 should be for flyers who have not won a major rubber contest will be put into the rules book when the rules freeze is lifted next year. And it is time that no doc scale was adopted by other states. In NSW it has become as important as scramble. Scale should be a rally type of event; no-one can say that one scale model is better than another when both are well built and well finished. Try a small AE motor to power your next scale model.



One of a range of small diesels available from Owen Engines is the AE 50 of half cc capacity. Recoil spring starter is not really necessary.



The latest in Coupe d'Hiver designs, this large model by John White has a wing loading of only 1.3 oz per sq ft (3.9 gr per sq dm), so is suitable only for calm conditions, but can manage about 3 minutes on 8 strands of 1/8 FAI black rubber, 15 inches long and packed with 480 turns, giving a 100 second motor run on a 21 x 19 prop. From FFn, with permission.

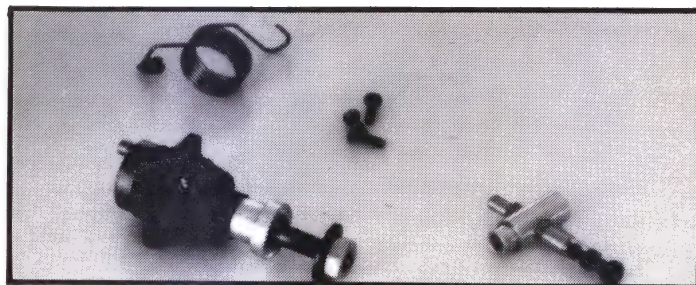
N.S.W. FREE FLIGHT SOCIETY (Inc) 1991 Contest & Fixture Calendar

Mar 2 & 3	Hunter Valley Champs	Muswellbrook
Sat:	HLG; Night Scramble	
Sun:	Combined; U/10 HLG; 1/2 Hr Scramble	
Mar 9 & 10	Victorian State Champs	
Sun Mar 10:	Combined Mini; HLG	Richmond
Sun Mar 17:	Old Richmond Day Vic Smeed Precision; NoDoc Scale; Vintage; Jetex; and anything else mates! Come and fly for fun.	Richmond
March 29 till April 1	AFFS Championships	Canowindra
Sun Apr 14:	Open Rubber, Glider & Power	Richmond
Sun Apr 21:	Outdoor Peanut Scale	Macquarie Uni
Sun Apr 28:	Combined F1A, F1B & F1C; Stomper	Richmond
May 18 & 19:	Veterans' Gathering	Muswellbrook
Sun May 26:	Combined Mini; HLG; Stomper	Richmond

Sun June 2:	Russell Forth Trophy	Berkley
June 8 to 10:	Trans Tasman Trials	Canowindra
Sun June 23:	F1G, F1H, Scale State Champs	Richmond
June 29 & 30:	State Champs	Richmond
Sat:	Scramble; F1J	
Sun:	P30; HLG	
Sun July 7:	Open Rubber, Glider & Power	Richmond
Sun July 21:	Vic Smeed Precision; NoDoc Scale; F1J	Richmond
Sun Aug 4:	Indoor HLG; Hangar Rat; Peanut Scale; Profile Scale	Seven Hills (Soccer Centre, Meurants Lane)
Sun Aug 18:	F1H; F1G; P30	Richmond
Sun Sept 8:	F1D; EZB; Indoor HLG; Peanut Scale	Seven Hills
Sun Sept 15:	Moth Day - any De Havilland Moth	Menangle
Sun Sept 22:	Open Rubber & Glider Scramble; HLG	Saltash
Oct 5 to 7:	State Champs	Richmond
Sat:	F1A (rounds)	
Sun:	F1B & F1C (rounds)	



The AE 50 dismantled. Crank shaft is still in its bearing which is attached to the case with four screws. Inlet venturi is retained by two grub screws.



The AE 50 dismantled. Tank is still attached to crankcase, on top of which sits cylinder with transfer ports, then the cylinder liner and head, all joined with three long screws.

Mon: Open Rubber & Power;
Combined Vintage
Sun Oct 20: Vic Smeed Precision; Richmond
DoDoc Scale; Combined
F1A, F1B & F1C
Sun Nov 3: Mills Trophy Scramble Berkley
Sun Nov 10: Old Richmond Day - Richmond
Vic Smeed Precision;
NoDoc Scale; Vintage;
Jetex; and
anything else mates!
Come and fly for fun.
Sat Nov 23: NSWFFS Presentation Dinner
Sun Dec 8: Twilight Meeting Richmond
P30 Challenge Cup;
& HLG 300 to 600 pm
Barbecue 1830 start

Enquiries to Barry Lee on (02) 602 7419

WORLD CUP RESULTS

F1A (14 contests, 143 flyers)

1. Juri Jablovkov	USSR	75
2. Ulf Edlund	S	60
3. Mikael Holmbom	S	45

F1B (14 contests, 129 flyers)

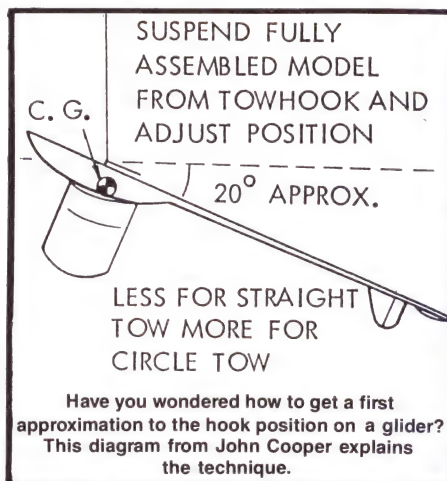
1. Alexander Andriukov	USSR	65
2. Giancarlo Polla	CH	60
3. Mike Woodhouse	GB	46

F1C (13 contests, 66 flyers)

1. Eugeny Verbitsky	USSR	75
2. C. Peter Wachtler	DDR	55
3. Jan Ochman	PL	52

F1E (5 contests, 37 flyers)

1. Jaroslav Mach	CS	55
2. Ivan Crha	CS	55
3. Ernst Reitterer	A	45



V.F.F.S. CONTEST CALENDAR 1991

March 9 to 11: Victorian State Champs - Brooklyn
F1A, F1B & F1C.
VMAA Trophy - Open Power.
HLG & Combined Mini
Mar 29 to 14th AFFS Canow-
to Apr 1 Championships indra
Apr 14: Indoor State Champs - Sunshine
Hangar Rat;
& Peanut; HLG; EZB;
Apr 20 & 21: Vic State Champs Ballarat
Vintage Power, Glider &
Rubber! F1G; F1H (Liddicut
Trophy); F1J; Scramble.
May 5: Combined Open & Brooklyn
Open Sports Comp

May 19: Vic State Champs Brooklyn
Open Rubber & Shaw Cup;
Scale; HLG
May 26: Indoor State Champs Sunbury
F1D & EZB
June 9: Vintage Day Brooklyn
Garnham Trophy
Hervey Trophy
June 30: Combined FAI; & Pommie Brooklyn
Design Nonsense Day
July 28: Combined Mini; HLG; P30 Brooklyn
Aug 25: Indoor State Champs - Sunshine
Peanut;
& Hangar Rat, HLG, EZB
Sept 22: Combined FAI; Scramble Brooklyn
Oct 20: Indoor State Champs HLG Sunshine
Peanut; Hangar Rat; EZB
Nov 17: Combined Mini and P30; Brooklyn
Combined Vintage
Dec 15: Indoor - Sunbury
F1D; EZB; HLG; Peanut.

The 1990 Free Flight Forum is now available. 80 pages of articles, plans and pictures. Topics include Stall Remedies by Mike Woodhouse, Per Findahl's approach to F1A Design and Construction, and John O'Donnell's tips on how to win. Steve Philpott describes the art of Magnet Soaring, Jim Baguley relates the history of F1B Development 1965 to 1990, and George Matherat reveals (in English) the secrets of Variable Tail-Tilt.

The price, air mail, is £8.30. Cheques should be made in pounds sterling, and payable to Newham Beaumont, Spring Cottage, Spring St., Ewell, Epsom, Surrey, KT17 1UH, England.

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FREE FLIGHT TOPICS

The 44th Nationals or the Great Free Flight Revival.

The conditions at the 44th Nats at Bendigo were a mixture of Hot and Cold, Hot and Windy, Hot and Wet, and Cold, Windy and Sudden. With the exception of the cold and sudden day, these are much the same conditions as most Nats.

The big surprise however was the increase in the numbers competing in Free Flight. There were 583 entries over the twenty four events compared with 269 entries over 18 events in Contro Line and 489 entries in the 26 events of Radio Control. These figures translated to about \$6,300 by FF, \$8,100 by RC and \$3,800 by CL in entry fees.

Because of the importance Aeromodellers of all disciplines attached to the Nats there are multiple entries for each person in Free-flight. The 170 people averaged 3.43 entries each (2.0 entries/person in Control Line and 1.93 entries/person in Radio Control).

In terms of entrants, there were 170 people who entered the Free Flight events, 253 Radio Control and 122 Control Line (this analysis countered teams - such as Pylon or Team Race - as one entry). A dramatic increase in interest over the previous two Nats and probably the best for over 10 years. There were a total of 467 people who entered the Nationals and if anyone likes addition they will find that the numbers of entrants above come to 545 not 467. The difference is, in fact, an indicator of the number of people who entered events in more than one discipline. To me this is a very healthy sign as it indicates the interest in aeromodelling as a whole.

People like Wal Schubach and Gary Sunderland entered the scale events in all three disciplines.

However, two of the biggest events at the Nationals were Freelight events: Hanger Rat 74 entries, Night Scramble, 51. RC Thermal Glider was the second biggest event with 57 entries. As usual the mad chaos of Night Scramble was the greatest spectator attraction with probably over 1000 onlookers. This created quite a problem for the organisers but all went well. Danny Maslowicz who flies in all three disciplines won.

Hangar Rat was not only the biggest event but the one that seemed to attract the most entrants from the other two disciplines. Although it is an unofficial event it has been one of the great successes of most of the recent Nats. (It didn't appear in the program a few years ago for some peculiar reason). Although it is a one design event it should clearly be an official event as soon as the rules freeze is over. Despite this excellent introduction to indoor flying all other branches of indoor were down this year, perhaps the 57 degree heat in the hall had something to do with it.

The other trend that has continued from the last couple of years is the strong support for Vintage events in all three areas of aeromodelling, 69 for 3 events in FF, 58 for 5 events in RC and 56 for 2 events in CL. Unfortunately the cold, wet and windy conditions hit the Vintage FF day and only 18 actually recorded times.

There were many outstanding performances but probably the best were those of Adolph Haas who broke the Australian duration record (yet to be ratified) in Peanut by nearly 25 percent, despite heat of 57 degrees in the hall. Ron Bird and Mike Hardy who fought each other until the 8 minute fly off round in 39 degrees heat when Ron finally won by a mere 2 seconds - 2284 sec. to 2282 sec.

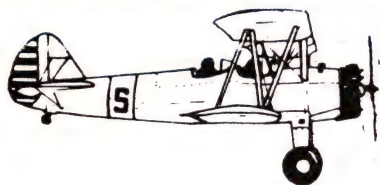
Richard Blackham who won FIB (Wakefield) and FIC and E2B. The first two are highly specialised events that are usually quite complicated enough for fliers to specialise in one only.

Keith Murray for becoming Free Flight Champion. He flew in almost every FF event and came third in three events and fourth in another amongst many other scores. Danny Maslowicz with three wins and one second out of about 5 events entered had a very good Nats.

Organisation was smooth and efficient. The field was good but the indoor venue not so good with near impossible temperatures recorded and some models brought down by heavy hanging cobwebs. Draft free conditions and good insulation are unfortunately rarely found together.

The Victorians, on their home ground, had an outstanding Nats taking 33 out of 68 places, 15 out of the 23 possible first places. NSW were next with 22 places (5 firsts, one of them shared by two New South Welshmen).

Darien Cassidy



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Victorian Hobby Centre, 1st Floor, 21A Swanston St., Melbourne, 3000;

(03) 650 4817

Williamstown Hobbies, 177 Ferguson St., Williamstown, 3016; (03) 399 9262

Wimmera Hobby Supplies, 12 Firebrace St., Horsham, 3400; (053) 82 2319

Wingspan Hobbies, 9C Clarke St., Lilydale, 3140; (03) 735 3466

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ABC Models P/L, Shop 11, 671 Gympie Rd., Chermide, 4032; (07) 350 3495

ABC Models P/L, Shop 5 Logan Court, Cnr. Logan Road and Doughty Ave., Holland Park, 4121; (07) 394 3899

ABC Models P/L, 48 Bundall Road, Sorrento, 4217; (075) 38 9433

Bundaberg Hobby World, 100 Barolin St., Bundaberg, 4670; (071) 52 7286

Downs Hobby Supplies, c/o The Hooper Centre, Hume St., Toowoomba, 4350; (076) 38 5322

Gabba Hobbies, 622 Stanley St., Woolloongabba, 4102; (07) 844 7735

Model Sports Queensland Pty. Ltd., 33 Station Street, Nundah, 4012; (07) 266 2260

Mr. Toys Toyworld, 3379 Pacific Highway, Springwood, 4127; (07) 208 9750

Mr. Toys Toyworld, 721 Gympie Rd., Lawnton, 4510; (07) 205 4153

RC Helicopters Aust., 9 Smailes Rd., Jimboomba, 4280; (075) 46 0139

Skate, Cycle & Leisure, Shop 28, Nerang Fair, Nerang-Beaudesert Road, Nerang, 4211; (075) 96 2911

Southside Hobby Centre, 216 Logan Rd., Buranda, 4102; (07) 393 0537

S.A.

ABC Models P/L, 117 Unley Rd., Adelaide, 5000; (08) 373 1191

ABC Models P/L, Shop 3, 1700 Main North Rd., Salisbury Plain, 5109; (08) 258 4485

Hobby Habit, 462 Main North Road, Blair Athol, 5084; (08) 349 6242

Model Flight, 42 Maple Ave., Keswick, 5035; (08) 293 3674

Model Mania, 253 Main South Rd., Morphettville, 5152; (08) 382 4957

Northern Discount Hobbies, Corner North East and Tartan Rd., Holden Hill, 5088; (08) 261 8929

South Australian Hobby Centre, 1st Floor, 135 Rundle Mall, Adelaide, 5000; (08) 232 0080

N.T.

North Australian Model and Hobby Supplies, 61 Dalwood Crescent, Sanderson, NT, 0812; (089) 27 7254

W.A.

ABC Models P/L, 42-44 Pier St., Perth, 6000; (09) 325 8117

ABC Models P/L, 532 Albany Highway, Victoria Park, 6100; (09) 362 4244

ABC Models P/L, 793 Canning Highway, Applecross, 6153; (09) 364 4255

Ace RC Models, 850A Beaufort St., Inglewood, 6052; (09) 370 3233

Discount Hobby Supplies, 454 Newcastle Street, West Perth, 6005; (09) 227 6789

Goldfield Hobby Supplies, 93 Bird Street, Boulder, 6432; (090) 93 2117

North Beach Cycles & Hobbies, Shop 2, 117 Flora Tce., North Beach, 6020; (09) 447 1450

Perth Hobby Centre, 385 Murray St., Perth, 6000; (09) 322 3376

Pitstop Hobbies, 604 Albany Highway, East Victoria Park, 6100; (09) 361 4450

Radio Model Supplies, 235 Albany Hwy., Victoria Park, 6100; (09) 362 2133

South West Model & Hobby Centre, Shop 7, Bunbury Blvd., Princes St., Bunbury, 6230; (097) 21 8487

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Toy Warehouse, 211 Invermay Road, Launceston, 7250; (003) 26 1577

P.N.G.

Graham's Hobby Centre, P.O. Box 1330, Rabaul, PNG; 675 92 2851

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Adhesive Solutions, Unit 2G, 1-7 Unwins Bridge Road, St. Peters,

NSW, 2044; (02) 550 6355

Australian Model Aerodrome, 367 St. Georges Rd., North Fitzroy, Vic., 3068; (03) 489 8282 & 489 8383

Bryzen Hobbies, 47 Macquarie St., Fennell Bay, NSW, 2283; (049) 59 1145

Burimex, 137 Pyrmont St., Pyrmont, NSW, 2009; (02) 388 7441

Competition Engines, 9-11 St. Johns Ave., Gordon, NSW, 2072; (02) 498 3675

Dawn Trading, 17 Tenterden Rd., Botany, NSW, 2091; (02) 666 4999

Full Ahead Aust., 56 Ladd St., Watsonia, Vic., 3087; (03) 435 6592

Futaba Sales Aust., 8 Railway Ave., Caulfield East, Vic., 3145; (03) 211 4984

Hobby Headquarters, 14/10 Yalgar Road, Kirrawee, NSW, 2232; (02) 545 1944

JR Remote Control Aust. Pty. Ltd., 424 Station St., Box Hill, Vic., 3128; (03) 890 0660

Kraft Systems, 59 Ryrie Street, Geelong, Vic., 3220; (052) 29 2191

Lion Electronics, 8 Irwin Street, Bellevue, WA, 6056; (09) 250 1925

Model Engines (Aust), 57 Crown St., Richmond, Vic., 3121; (03) 429 2925

Model Helicopters International, 98 Derby Street, Kew, Vic., 3101; (03) 853 6017

Modelcraft Industries International, P.O. Box 471, Hillarys, WA, 6025; (09) 401 3646

O'Reilly, Leo, 42 Maple Ave., Keswick, SA, 5035; (08) 297 7349

Radio Control Supplies, Unit 7, Lot 14 Dean Place, Penrith, NSW, 2750; (047) 31 4145

Southern Model Supplies, P.O. Box 112, Daw Park, SA, 5041; (08) 276 7722

Tates Performance Hobbies, 135 Shannon Ave., Geelong West, Vic., 3128; (052) 22 4201

The Hobby Consultants (Cipolla), 17 Seaview Road, Cockatoo, 3781; (059) 68 8293

Western Flying School, 1/31 Forge Street, Blacktown, NSW, 2148; (02) 622 9996

X-Cell Products, P.O. Box 67, Ramsgate, NSW, 2217; (02) 588 6453

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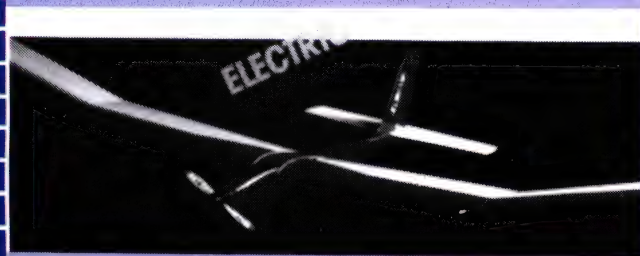


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She's a high-flying beauty with a personality that couldn't be more down-to-earth. So don't let her high-tech T-tail scare you. She builds easy and handles like a trainer.

She'll shrug off standard 2-meter high-starts and her exceptionally low sink-rate will reward you with impressive durations. (See the electric power pod option, p. 12!)

Wingspan: 78.25"
Wing Area: 663 Sq."
Flying Weight: 25-29 Oz.
Radio: 2-Channel (Minimum)



The Electra (W/Motor, No. 40. W/O Motor, No. 41)

Here's the plane that electrified America! With her Turbo 550 motor (included in kit no. 40), you can figure on nearly 5 minutes of powered flight and total times of 10-12 minutes—even in "dead" air.

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Wing Area: 663 Sq."
Flying Weight: 48 Oz.
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Radio: 2-Channel (Minimum)

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The Gentle Lady gives beginners plenty of time to sort things out and her efficiency helps experienced flyers to get those extra-long flights. (See the electric power pod option, p. 12!)

Wingspan: 78.25"
Wing Area: 663 Sq."
Flying Weight: 22-25 Oz.
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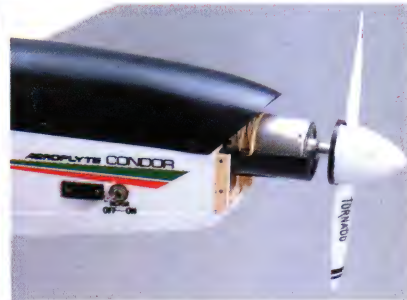
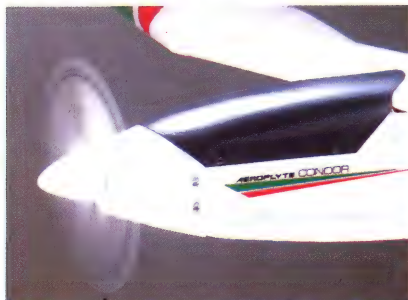
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